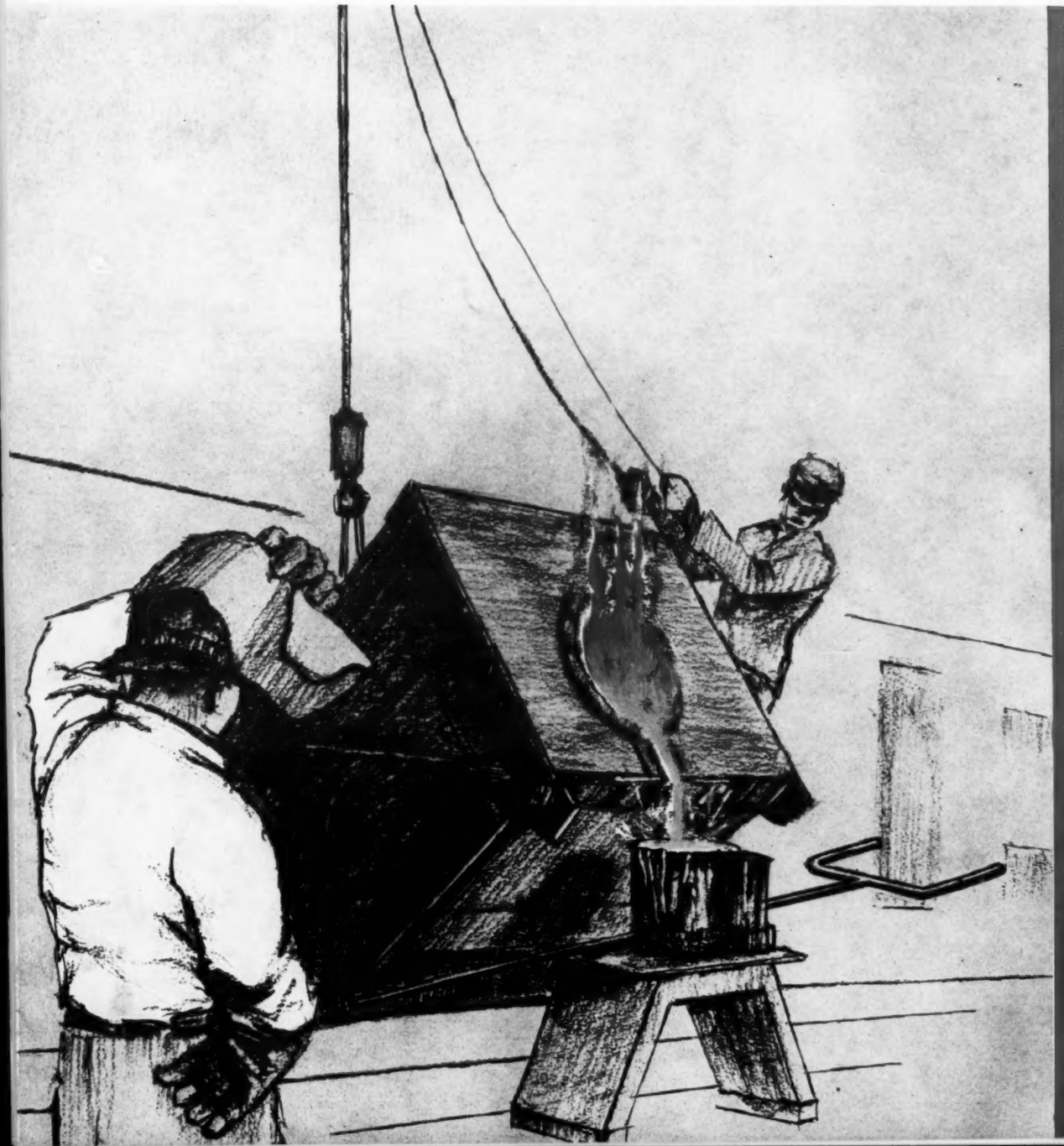
NOVEMBER, 1957

modern castings



The Foundrymen's Own Magazine

Electronic Sandman

Automated sand moisture control system tightens quality control program at Cadillac Motor Car Div. foundry

Specialize and Grow

Alloy Steel Casting makes nothing but stainless steel castings and has enjoyed steadily increasing sales

Rapid Chemical Analysis

Griffin Wheel's advanced lab techniques produce an analysis of electric furnace steel under five minutes

Safe Grinding Operations

Faster, safer production from grinding wheels is the result when proper safety precautions are observed

No More Zinc Shakes

Portable dust and fume collector solves air pollution problems for an Indianapolis non-ferrous foundry

Molding Machines

Three steps to take to get the most profitable use from your molding machines are described in this months' Special Bonus Section

future meetings and exhibits

NOVEMBER

Oct. 31-Nov. 1 . . *Purdue Metals Casting Conference*. Purdue University, Lafayette, Ind.

Oct. 31-Nov. 2 . . National Metal Trades Association, *Convention*. Conrad Hilton Hotel, Chicago.

1 . . Malleable Founders' Society, *Eastern Section Meeting*. Hotel Commodore, New York.

2-10 . . *International Congress & Exhibition of Measuring Instrumentation and Automation*. Dusseldorf, Germany.

3-8 . . American Society for Metals and Society for Nondestructive Testing . . . *2d World Metallurgical Congress, 39th Annual National Metal Congress & National Metal Exposition*. Morrison Hotel & International Amphitheatre, Chicago.

6-8 . . Special Libraries Association, *Metals Division Meeting*. Knickerbocker Hotel, Chicago.

7-8 . . National Foundry Association, *Annual Meeting*. Waldorf-Astoria Hotel. New York.

11-13 . . Steel Founders' Society of America, *12th Technical and Operating Conference*. Carter Hotel, Cleveland.

14-15 . . Council of Profit Sharing Industries, *10th Annual Profit Sharing Conference*. Hotel Commodore, New York.

18-19 . . Air Pollution Control Association, *Semi-annual Technical Conference*. Fairmont Hotel, San Francisco.

19-21 . . Investment Casting Institute, *Annual Fall Meeting*. Sheraton Hotel, Chicago.

DECEMBER

1-6 . . American Society of Mechanical Engineers, *Annual Meeting*. Statler Hotel, New York.

3-4 . . Foundry Facings Manufacturers Association, *Annual Meeting*. Hotel Waldorf-Astoria, New York.

4-6 . . American Institute of Mining, Metallurgical and Petroleum Engineers, *Electric Furnace Steel Conference*. Penn-Sheraton Hotel, Pittsburgh, Pa.

5-7 . . National Association of Manufacturers, *Annual Meeting*. Waldorf-Astoria Hotel, New York.

6 . . Malleable Founders' Society, *Western Section Meeting*. Drake Hotel, Chicago.

9 . . AFS Nominating Committee, *Annual Meeting*. Union League Club, Chicago.

1958

JANUARY

17 . . Malleable Founders' Society, *Semi-annual Meeting*. Hotel Cleveland, Cleveland.

27-30 . . *Plant Maintenance & Engineering Show*. International Amphitheatre, Chicago.

FEBRUARY

6-7 . . Malleable Founders' Society, *Technical & Operating Conference*. Wade Park Manor, Cleveland.

10-14 . . American Society for Testing Materials, *Committee Week*. Hotel Statler, St. Louis.

13-14 . . AFS *Wisconsin Regional Foundry Conference*. Hotel Schroeder, Milwaukee.

16-20 . . American Institute of Mining, Metallurgical & Petroleum Engineers, *Annual Meeting*. Hotels Statler and Sheraton-McAlpin, New York.

20-21 . . AFS *26th Annual Southeastern Regional Foundry Conference*. Patten Hotel, Chattanooga, Tenn.

MARCH

12-13 . . Foundry Educational Foundation, *College-Industry Conference*. Hotel Cleveland, Cleveland.

17-18 . . Steel Founders' Society of America, *Annual Meeting*. Drake Hotel, Chicago.

APRIL

13-18 . . American Chemical Society, *Spring Meeting*. San Francisco.

14-18 . . American Welding Society, *Annual Meeting and 6th Welding Show*. Statler Hotel, St. Louis.

MAY

1-8 . . American Society of Tool Engineers, *26th Annual Meeting & Convention*. Convention Center, Philadelphia.

19-23 . . American Foundrymen's Society, *62d Annual Castings Congress & Foundry Show*. Public Auditorium, Cleveland.

JUNE

9-12 . . Material Handling Institute, Inc., *National Materials Handling Exposition*. Public Auditorium, Cleveland.

22-27 . . American Society for Testing Materials, *61st Annual Meeting*. Hotel Statler, Boston.

Circle No. 142, Page 7-8

British Report on Sodium Silicates for Bonding Sand

■ With the CO_2 process, bond is due to sodium silicate which has had its viscosity increased in place by gassing with CO_2. This is one of the conclusions reached by F. W. Nield and David Epstein, London, England, in their report on *"Application of Sodium Silicates for Bonding Sands,"* presented at the International Foundry Congress, Stockholm, Sweden, in August, 1957.

Other conclusions:

1. With the CO_2 process, only sodium silicates of low SiO_2:Na_2O ratio, about 2.0, are suitable for use in foundry practice.
2. When selecting a grade of low ratio sodium silicate to meet any given conditions, care must be taken to select a sodium silicate with a total solids content which will not produce a gel on gassing with CO_2.
3. As the amount of CO_2 normally used is greatly in excess of that actually required for curing, it can be reduced by dilution with air.
4. Blowing hot air or stoving cured cores for short periods, at about 212-392 F, will increase (up to approximately 50 per cent) the compression strength. In certain cases this will permit a reduction in the percentage addition of sodium silicate.
5. An addition of water retaining materials will improve the bench life of sodium silicate sand mixes.
6. The CO_2 present in air does not shorten the bench life of sodium silicate sands nor does it react with the binder in gassed cores appreciably. The changes which do take place are due to drying.
7. Break down of cores depends upon the temperature reached in various parts of a core and on the percentage and ratio of sodium silicate in the sand.

Government Releases Books On Electronic Instruments

■ Development of two simple, time-saving electronic instruments in the metals industry is reported by the U. S. Army. One is an automatic recorder of true stresses, the other a signaller to reduce quench cracking. Ordered through the Office of Technical Services, U. S. Dept. of Commerce, Washington, D. C. They are: *True Stress vs Elongation Recorder*, PB 131104, 22 pp, and *An Electronic Signaller to Reduce Quench-Cracking of Steel*, PB 131111, 38 pp.

Circle No. 143, Page 7-8

November, 1957
vol. 32, no. 5

modern castings

in this issue

BONUS SECTION

COVER PHOTO: Courtesy of Alloy Steel Casting Co.

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AUDITED PAID CIRCULATION ABC

Scrapping a Bad Habit

The castings industry loses millions of dollars each year in sales because of a bad habit. This bad habit is the deleterious association of the word "defect" with our product—castings.

Outside the foundry industry the word "defect" refers to failure of a product in service. Consequently our customers interpret the extensive discussion and references to "casting defects" as an admission that a large part of our production is destined to fail in service. The casting buyer, as he hears us speak or when he reads our periodicals and technical papers, is subjected to a large amount of casting defect subject matter. "Brain washed" by continued repetition it is only natural that he associates castings with defects, resulting in a very low evaluation of our product—castings.

The general acceptance of castings as high-quality products can only be secured if we in the industry will always associate castings with the word quality. Foundrymen must make a positive sales approach, namely one of quality. A casting defect study is a negative sales approach. Casting quality control is a positive sales approach. Think, talk, and write "quality control," not "defect control."

Some may feel that it is impossible to delete the term defect from our foundry speech or literature. On the contrary, it is a very simple change of thought.

Remember that according to the common American usage a defect is something purchased. A scrap or a loss is something that you do not sell. Thus foundrymen should use the term scrap or loss in place of defect. Our customer thus feels assured that he is not expected to receive defects since scrap and losses are returned to the melting department.

The only time a casting has a defect is when a fault or failure occurs after a casting is shipped to the customer. This is very damaging and calls for action.

Competitors outside of the foundry industry would be pleased to have us continue our old practice of associating defect with scrap castings in the plant. Don't help them to increase their sales at our expense. Promote quality — sell castings.

Harry W. Dietert, *President*
American Foundrymen's Society

Canadian Foundry Departs from Standard Practices

by L. G. Day / *Plant Manager*
Light Alloys Limited
Haley, Canada

■ Light Alloys Ltd., Haley, Ontario, Canada, started operations in 1951 making castings for gas turbine engines and airframes.

Floor molding accounts for an important part of operations since much of the production does not justify setting up for machine operations.

We have found it economical to use magnesium flasks, not only for their weight-saving qualities but also because of their rigidity. Compared to steel flasks, they retain their pin centers with greater accuracy for a longer time. The magnesium flasks are used for both large and small work. Used on pin lift equipment for cope and drag work, the weight-saving advantage reduces operator fatigue.

For match plate operations, wooden snap flasks are used. Where necessary, a cast magnesium jacket is slipped on the mold before pouring.

On the molding floor a mobile sand slinger is available for ramming large molds once they have been faced with facing sand.

Gates and Risers

Fairly extensive use is made of exothermic riser sleeves. There are instances where, owing to the design of the casting, or where turbulence must be avoided, that bottom gating is essential. With this practice, it is inevitable that the risers are filled with metal cooled by its passage through the lengthy gating system. The use of exothermic riser sleeves not only provides a hot riser but also one of relatively small volume.

The riser sleeves are made from an exothermic compound and water. The sleeves are rammed up in a core box and dried. In preparing a suitable composition for the exothermic mixture, permeability is one of the most important factors.

During the reaction, a considerable volume of gas is evolved. It must be able to escape through the wall of the sleeve and not be forced into the riser or junction of the casting and riser. The superheated metal in the riser becomes slightly contaminated with aluminum and silicon. Since volume shrinkage is high, precautions must be taken to insure that this metal does not shrink into the body of the casting.

Sleeve permeability is controlled by the composition and particle size of the exothermic mix, the added moisture content, and the density of the sleeve after ramming.

Close Control Key to Heat Treating Castings

by L. R. JENKINS / *Chief Metallurgist*
Wagner Malleable Iron Co.
Decatur, Ill.

■ Controlled annealing of malleable iron castings is an important key to their uniform physical properties. Predictable response to heat treatment is born in the molten metal. Constant surveillance is the key to uniformity. All elements whose presence and effect are known must be analyzed and controlled accordingly.

Three major elements must be considered in the melting—silicon, manganese, and carbon. *Silicon*—should be kept at a minimum for a given heat treat cycle. Maximum and minimum contents have a strong influence on the resulting tempered hardness range of air-quench, arrested-anneal, pearlitic malleable. *Manganese*—use the minimum required to control the sulphur, any surplus is wasted. *Carbon*—additions to an air furnace are not desireable. A carbon drop in air furnace indicates refinement.

Heat Treating

In the first stage anneal a minimum time is required. Any excess is a waste of both heat and production capacity. The nodule count decreases with time at the temperature. Furnace atmosphere appears to affect the minimum annealing time required and the production of sub-surface nodules.

The time of second stage anneal should also be kept short. There is a relation of secondary graphitization to existing nodules. A high nodule count requires a shorter time at temperature. Atmosphere control keeps the nodule count high at casting surface.

Hardening Cycle

The hardening cycle is used to produce hardness higher than obtainable by air quenching, particularly in heavy sections. It is important to quench to a full martensite for the best in uniformity and toughness. Combined carbon content will influence this procedure.

Tempering Cycle

Air quenching partially spheroidizes the pearlite. A fine pearlite structure spheroidizes more rapidly.

Oil quenching precipitates combined carbon as spheroids. The tempering temperature determines the final hardness of the castings. Time at temperature is less important when tempering castings that have been oil quenched than if air quenched.

Circle No. 145, Page 7-8

Build an idea file for plant improvements. The post-free cards on pages 7-8 will bring more information on these new . . .

products and processes

CO_2 shell molds for semi-precision casting technique are suitable for most metals. Combines close-tolerance aspects of shell molding with time, labor, and equipment saving features of CO_2 process. Little investment needed to use new process which requires only a CO_2 gas supply, regulating equipment, gassing heads, inexpensive sodium silicate binder and patterns.

Foundries in Ohio and Oklahoma report molds made equivalent to shell molding for accuracy and finish. Sodium silicate and 100-180 gfs sand are mixed and rammed around pattern.

Inorganic bond is said to withstand high temperatures, lessening cracks caused by thermal shock.

Gassing with CO_2 hardens mold in 15-30 sec compared to 40-75 sec for shell molds. Operations are carried out at room temperature allowing use of wood, aluminum or plastic patterns. Eliminates need for heat resistant metal patterns used in shell molding. Molds ½-in. thick are said to be practical. *National Cylinder Gas Co.*

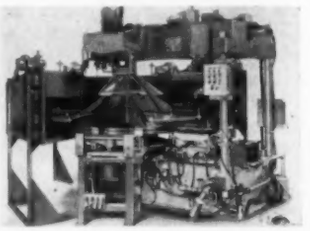
For Manufacturer's Information Circle No. 1, Page 7-8

Shakeout belt in Ohio malleable foundry has operated 18 months, 24 hours daily, five days weekly without

shutdown. Four-ply belt, 24-in. wide, 330-ft long, travels 300 fpm. Rubber remains pliable and elastic even when exposed for long periods to the baking action of shakeout sand at 350 F. Previously belts were replaced every three months. *B. F. Goodrich Industrial Products Co.*

For Manufacturer's Information Circle No. 2, Page 7-8

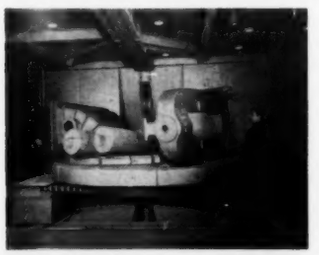
Shell mold and core machines feature multiple station indexing available with 2, 4, 5 or 6 stations. Uniform density and controlled shell thickness and accuracy are claimed for airstream blowing method. Rapid and



continuous production results from automatic preset time cycles. Fast stripping with shell removal and transfer features are aid to productivity and efficiency. Multiple oven stations allow controlled cure time at high production rates. *Osborn Mfg. Co.*

For Manufacturer's Information Circle No. 3, Page 7-8

Airless centrifugal blast cleans castings weighing 18,600 lb in 26 min,



a 3½-hr saving over former method. Installation at Connecticut foundry has cut cleaning time from two shifts to a single shift.

Cleans loads up to 10 tons in a few minutes instead of several hours even

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Please use card before May 1, 1958

■ **Details on these products and processes are available to MODERN CASTINGS readers. See pages 7-8.**

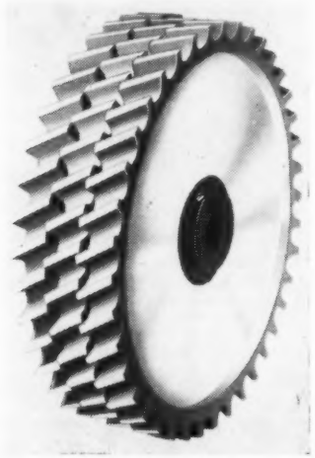
on castings poured in cement bonded molds. *Wheelabrator Corp.*

For Manufacturer's Information Circle No. 4, Page 7-8

Flame cutting and scarfing powder introduced into oxygen stream increases the flame temperature allowing cutting of heavier castings and oxidation-resistant metals such as iron, high-temperature alloy steels, and copper. Removes burnt cores, sand inclusions, fins, gates and risers with ease. Cuts reinforced concrete, fire brick. *Hoeganneas Sponge Iron Corp.*

For Manufacturer's Information Circle No. 5, Page 7-8

Rubber contact wheels increase life of abrasive belts up to 200 per cent. Deep serrations are key to faster cutting and ability of belts to hug



contours of complex casting shapes. Wheels are 1-in. wide and can be mounted adjacent for any desired belt width. *Chicago Rubber Co.*

For Manufacturer's Information Circle No. 6, Page 7-8

Portable Brinell hardness tester has chain adapter to lock it securely on castings regardless of shape or size. Clear, accurate Brinell impressions quickly obtained. Portability makes it useful in testing large castings. *King Tester Corp.*

For Manufacturer's Information Circle No. 7, Page 7-8

Block insulation for heat treating or metallurgical furnaces combines exceptional heat resistance with insulating value. Made from calcined diatomite blended with other insulating materials and bonded with asbestos fibre. Withstands temperatures to 1900 F without deterioration. Weighs

only 2 lb per sq ft per in. thickness and may be cut with knife or saw for fitting around openings or irregular surfaces. Approximately 6 tons per sq ft required to compress brick 1/8-in. *Johns-Manville Corp.*

For Manufacturer's Information Circle No. 8, Page 7-8

Automatic loader for heat treat furnaces or continuous tumbling; increases production up to 100 per cent; cuts rejects and lowers labor costs by doing the work of two men. Delivers 500-5000 lb of small castings hourly with steady feed rate said to vary less than 5 per cent. *Michigan Crane & Conveyor Co.*

For Manufacturer's Information Circle No. 9, Page 7-8

Corrosion-resistant drums and buckets with plastic-bonded liners resist corrosive action of materials used in

foundries and patternshops. Available in 5-gal buckets, 30- and 55-gal drums. *Michigan Chrome & Chemical Co.*

For Manufacturer's Information Circle No. 10, Page 7-8

Lightweight scriber, magnesium, weighs ¼ that of steel, permitting faster measuring of large models. Tip is hardened and made of ground tool steel. Available in six standard sizes up to 48 in. long. *Challenge Machinery Co.*

For Manufacturer's Information Circle No. 11, Page 7-8

High temperature alloy for high stresses to 1500 F and moderate stresses to 2000 F, has excellent oxidation resistance and good ductility. Sand cast properties after 2-hr heat treating at 1800 F: ultimate tensile, 21,800 psi; elongation in 2 in., 30.5 per cent; reduction of area, 41.5 per cent. Uses of this alloy include exhaust manifolds, turbine blades, bolts exposed to heat, and parts contacting acids. *Haynes Stellite Co. Div., Union Carbide Corp.*

For Manufacturer's Information Circle No. 12, Page 7-8

Magnetic conveyor-elevators capable of being laid at angles up to 90 deg, save floor space in transporting ferrous castings and other magnetic materials. Alnico V-magnets are fastened

■ **Details on these products and processes are available to MODERN CASTINGS readers. See pages 7-8.**

under new or existing conveyor belts. Material handling accelerated, made safer, in less floor area. *Eriez Mfg. Co.*

For Manufacturer's Information Circle No. 13, Page 7-8

Mobile loading ramp cuts fork truck loading time. Has hydraulic lift for quick elevation and spring-actuated safety chains for secure attachment.

Side curbs prevent scuffing and gouging truck tires. Adjustable from 24 to 61 in. high, 59 to 70 in. wide, and 7000-16,000-lb capacity. *Magline Inc.*

For Manufacturer's Information Circle No. 14, Page 7-8

CO_2 binder comes in three collapsabilities; for general purpose, high and low temperature metals. *Para Products Div., Foundry Rubber, Inc.*

For Manufacturer's Information Circle No. 15, Page 7-8

Air regulator-filter-lubricator unit prolongs life of pneumatic tools and equipment by regulating air pressure, filtering water and dirt from air lines, and lubricating air stream with an oil mist. Easily installed, this 3-in-1 unit reduces tool repairs, increases production profits with less production shutdowns. Available in ¼, ⅜, ¾ in. pipe sizes. *Perfecting Service Co.*

For Manufacturer's Information Circle No. 16, Page 7-8

Cut-off saw, automatic, for non-ferrous work, is available in 24-and 36-in. stroke sizes. Has hydraulically operated carriage adjustable for cutting and return feed speed up to 55 fpm. *C. O. Porter Machinery Co.*

For Manufacturer's Information Circle No. 17, Page 7-8

Dust collector has no moving parts for minimum maintenance. Consists

of nine cylindrical bags 4 or 6 ft long. Cleaned by introducing jet of high pressure air through venturi above each filter cylinder. One tube cleaned at a time so that dust collection is not interrupted. Jets controlled by series of solenoid valves actuated by electric timer which can be varied to meet different load conditions. *Pulverizing Machinery Div., Metals Disintegrating Co.*

For Manufacturer's Information Circle No. 18, Page 7-8

Fork lift truck with new "Elbolift" principle can lift 10 ft without a mast. Electric-driven, only 48-in. wide and 80-in. high, truck lifts 12,000-20,000 lb; and easily maneuvers in boxcars or narrow aisles. Load can be tilted

and lifted separately or simultaneously at any point. Safety control applies brake and returns controller to neutral when driver dismounts. *Automatic Transportation Co. Div., Yale & Towne Mfg. Co.*

For Manufacturer's Information Circle No. 19, Page 7-8

Vertical pneumatic grinder is equipped with two handles for easier control. Smooths rough spots on cast-

ings with 6-in. cup wheel, wire brush or flexible sanding disk. Weighs 11 lb, operates at 4500 to 6000 rpm. *Airetool Mfg. Co.*

For Manufacturer's Information Circle No. 20, Page 7-8

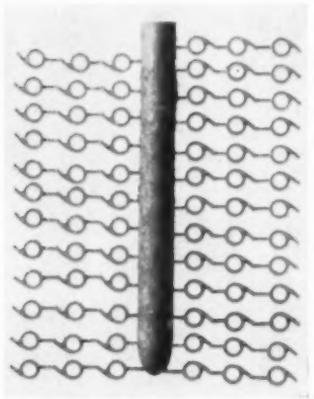
Power hack saw blade has new design that increases blade life 300 per cent, and reduces initial impact at the start of cutting stroke 50 per cent. Shatterproof blade has progressive tooth setting with the amount of set increasing in infinite degrees from

Circle No. 150, Page 7-8

starting to finishing ends of the blade. Metal is said to be displaced gradually and smoothly rather than hogged out. *E. H. Wachs Co.*

For Manufacturer's Information Circle No. 21, Page 7-8

Pattern and tablet letters made in metal dies are said to draw easily from all types of molding materials and to



reproduce accurately. Forty-one standard types available in sizes from 3/32- to 6-in. *Canton Products.*

For Manufacturer's Information Circle No. 22, Page 7-8

Overhead sand system, built as package unit, saves floor space because it is filled by a front-end loader. Conditioned sand is discharged onto flat belt conveyor with plows diverting sand into each molder's hopper. *Foundry Div., Jeffrey Mfg. Co.*

For Manufacturer's Information Circle No. 23, Page 7-8

Ball point marker uses heat resistant inks that permanently mark metal, wood, and plastic. Ink will not chip,

peel, fade or rub off rough or smooth surfaces. Three sizes available in eight colors. *John P. Nissen, Jr. Co.*

For Manufacturer's Information Circle No. 24, Page 7-8

Casting cart, rubber-tired, wheelbarrow style, for moving castings within plant. Pan, holding casting at hip-height, is separate unit and may be used with conveyor track. Carts can be dovetailed to form a continuous

Circle No. 150, Page 7-8

line. Unit weighs 129 lb, has 700-lb load capacity. *Nomad Equipment Div., Westover Corp.*

For Manufacturer's Information Circle No. 25, Page 7-8

Carbon sand, highly refractory with low expansion characteristics, is said to reduce buckling, scabbing, and metal penetration. Material is made from hard burned coke and has grain fineness and distribution similar to silica sand. Is not wetted by molten iron making it applicable for a molding material. May be used as a facing sand by the addition of such bonds as fire clay, bentonite, cereal, and pitch. On heavy castings the carbon sand facing is applied 1½-in. thick and backed with silica sand. The mold is coated in normal manner with a carbon base blacking. *J. S. McCormick Co.*

Circle No. 26, Page 7-8

Laboratory furnace, operating on any available fuel gas, reaches 3200 F from room temperature in one hour. Holds temperature with fuel consumpton of 160,000 Btu hourly. Charge space is 2¾ in. high x 4½ in. diameter. Samples up to 5 in. high x 4 in. diameter may be handled by removing single element. Maximum temperature after removal is 2800 F. Overall dimension is 14x19 in., including legs for bench mounting. *Selas Corp. of America.*

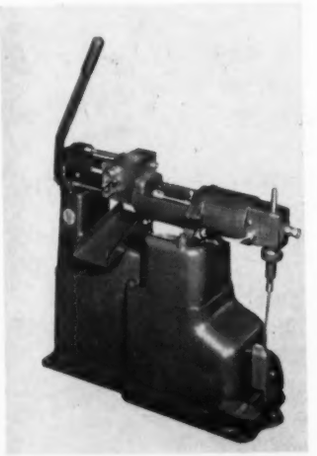
Circle No. 27, Page 7-8

Cleaning machine uses your compressed air to raise and lower 21x 18 in. platform holding up to 75 lb of castings. Castings easily loaded and unloaded after immersion in 30-gal

tank containing cleaning solvent, acid, or alkali. Washes automatically. *Magnus Chemical Co.*

For Manufacturer's Information Circle No. 28, Page 7-8

Die casting machine, aluminum cold chamber type, produces small parts too costly to put on larger machines. Used for casting aluminum alloys around electric motor rotors, eyeglass



frames, armament parts, electrical fittings, and toys. Air-operated, impact-type injection system assists high-speed operation. *British Machines & Foundry Supplies Ltd.*

For Manufacturer's Information Circle No. 29, Page 7-8

Cleaning machine for removing primer paint on large castings, agitates parts weighing up to 20 tons through a cleaning solution which removes paint and dirt. Operation cuts time and labor. Small parts may be cleaned at same time. *Magnus Chemical Co.*

For Manufacturer's Information Circle No. 30, Page 7-8

Solid laminated rubber tires eliminate blowouts and flats on industrial trucks. Last longer, provide more traction, and reduce operating cost 85 per cent. Fit any split wheel or flat base rim or wheel. *Notat Tire Co.*

For Manufacturer's Information Circle No. 31, Page 7-8

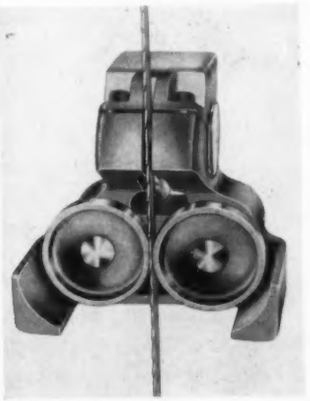
Alumina brick is suitable for severe temperature locations in furnaces. High density gives this 70 per cent alumina brick excellent resistance to slags and abrasion. Meets A.S.T.M. specifications for this refractory classification. *Ironton Fire Brick Co.*

For Manufacturer's Information Circle No. 32, Page 7-8

pH meter has 3 in. scale covering range from 0 to 14 in increments of 0.2. Suited for pH tests as well as titrations. Furnished with either individual glass and calomel electrodes or combination glass-and-calomel electrode. *Photovolt Corp.*

For Manufacturer's Information Circle No. 33, Page 7-8

Band-saw guide places thrust wheel so back of blade rides on outside perimeter of wheel rather than along side of wheel. Said to be 166 per cent more efficient. This radial application permits use of smaller bearing

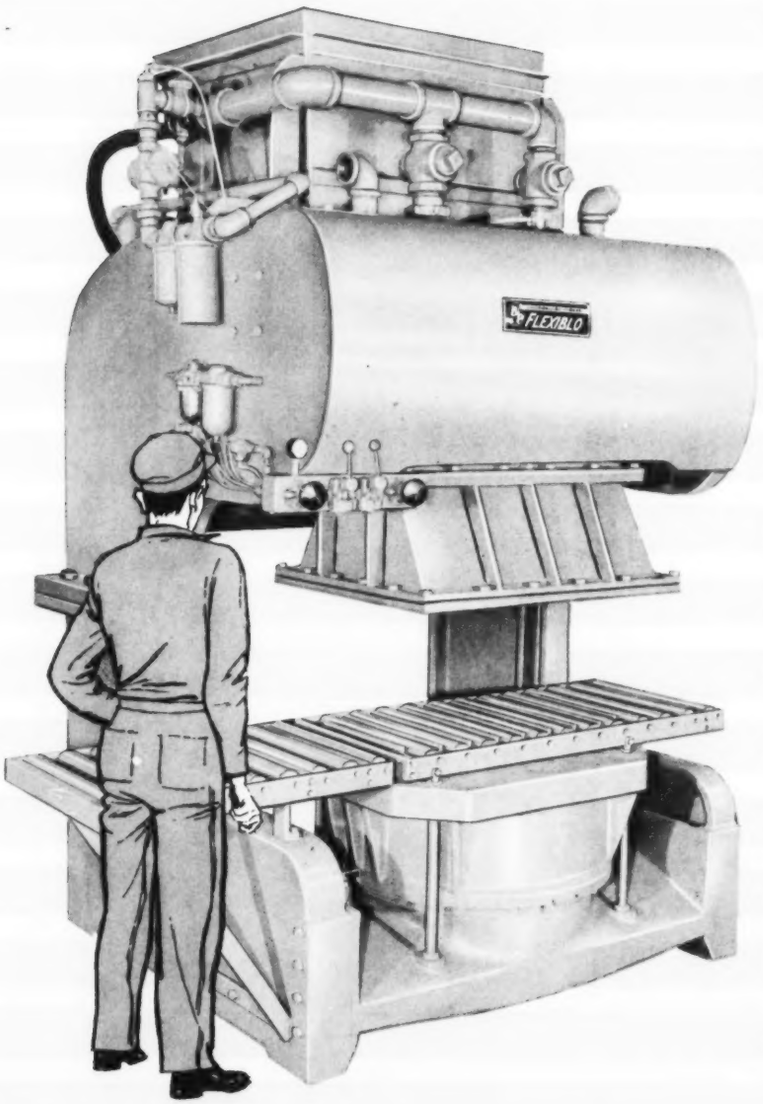


which can be operated at higher speeds and take heavier thrust load. Said to work equally well on heavy and light loads and handle thrust loads to 175 lb at maximum speeds, to 500 lb at lower speeds. Can be adapted to practically any band saw. *Carter Products Co.*

For Manufacturer's Information Circle No. 34, Page 7-8

Portable hardness tester provides faster testing by giving readings in Rockwell or Brinell. Specimen hardness

NOW THE CB30C



LARGEST OF THE NEW FLEXIBLOS guaranteed to blow any core box, wood or metal, that can be blown on any machine and to blow it faster, harder and with less wear on core box face or joint and cavity.

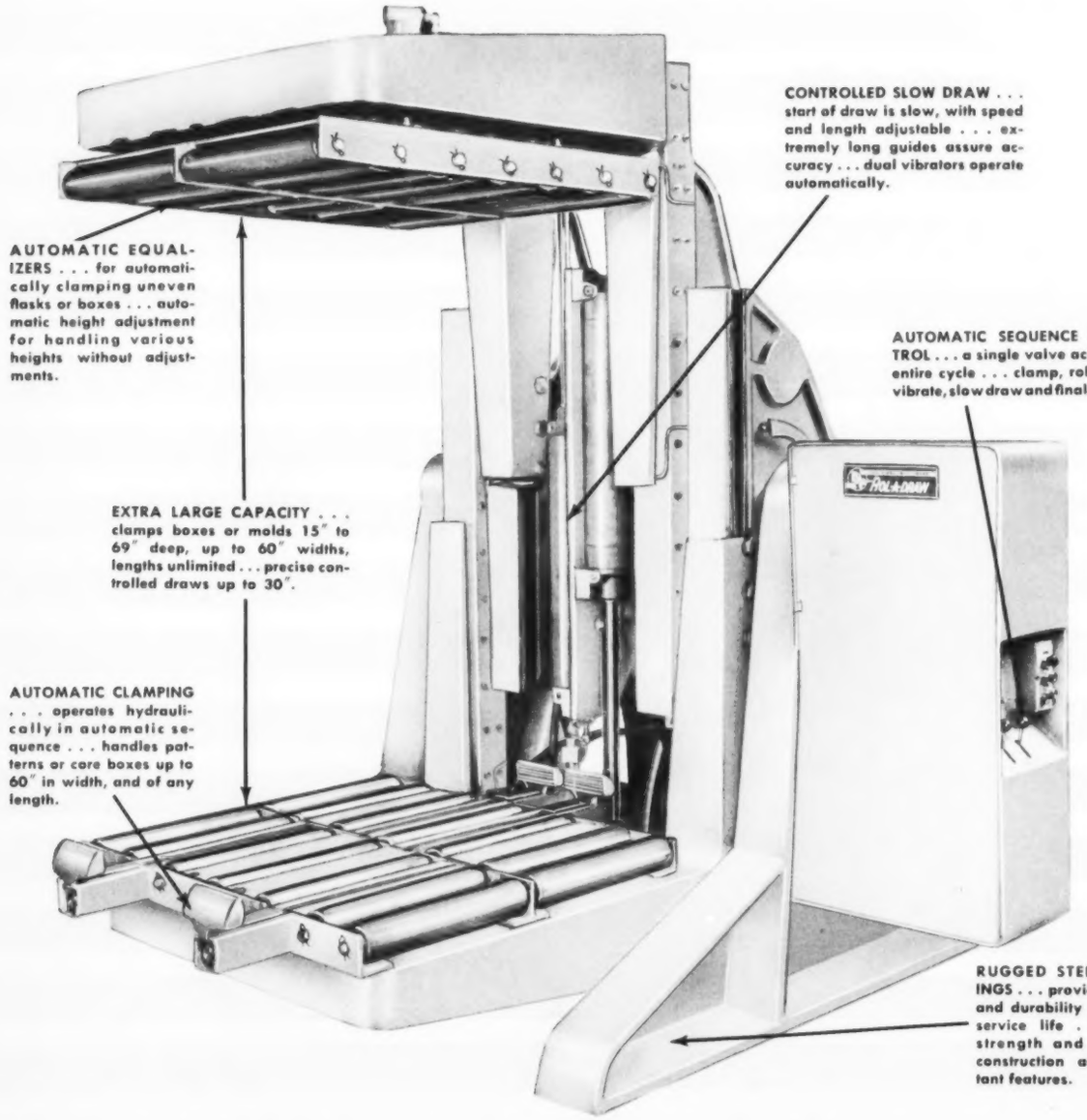
CAPACITY 400 LBS. FOR JOBBING OR PRODUCTION

- √ All pneumatic control—single air line is only connection to machine.
- √ Push-button operation with dual buttons for safety . . . actuate entire cycle, clamp, blow, draw and magazine reload.
- √ Twin blow valves with high-speed, high agitation exhaust through magazine.
- √ Two-speed air-on-oil draw with fully adjustable slow draw.
- √ Instant adjustment of table height and "daylight".
- √ Open-end and open-throat design for front-to-back or side-to-side operation.
- √ Automatic magazine loading with automatic vibrator operation.
- √ Greater magazine open area . . . no sand bridging.
- √ Optional 3-in-1 Blow—Pulse—Prefill operation in this single Flexiblo.

Want full information? Write today to Beardsley & Piper, Div. Pettibone Mulliken Corporation, 2424 N. Cicero Avenue, Chicago 39, Illinois, or use the reader service card in this magazine.

REDUCE CRANE HANDLING-COST-DELAY!

A New 5000 Lb. Rol-A-Draw • Floor Mounted • Rolls Over and Draws Patterns and Core Boxes to 30″



THE ALL-HYDRAULIC 5030 ROL-A-DRAW... FAST, RUGGED and FLEXIBLE

Now this new 5000 lb. Rol-A-Draw brings all of the precision and cost advantages of machine rollover and draw to jobbing or production foundries handling large molds or cores. No pits are required for installation, and it features a 30-second automatic operating cycle with full 30″ draw. Not only fast, this new Rol-A-Draw is the most flexible yet designed. It automatically handles any flask or core box within its wide range without machine adjustments. It's ideal for multiple station molding or coremaking units, where its low "roll-in" height is invaluable. Automatic loading and ejection also available for production operation.

Want full information? Write today to Beardsley & Piper, Div. Pettibone Mulliken Corporation, 2424 N. Cicero Avenue, Chicago 39, Illinois, or use the reader service card in this magazine.

PROGRESSIVE FOUNDRIES LOOK TO
BEARDSLEY & PIPER
FOREMOST DEVELOPER OF FOUNDRY MACHINERY
B&P
MEMBER FEMA

■ **Details on these products and processes are available to MODERN CASTINGS readers. See pages 7-8.**

causes penetration mechanism to hydraulically force a fluid into a capillary tube under the dial. Six ranges of tester are available. *Newage Industries Inc.*

For Manufacturer's Information Circle No. 35, Page 7-8

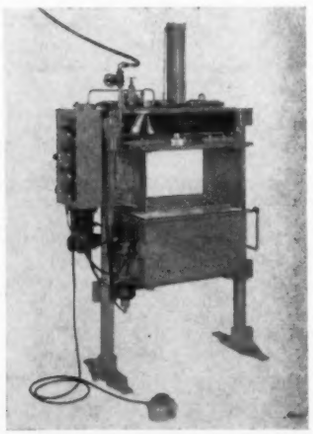
Pilot air valve uses dust-tight synthetic rubber boot to eliminate premature wear and leaking around pilot valve stem due to sand, scale, or chips. May be used as 2- or 3-way valve. Withstands 150 psi; has ¼-in pipe ports. *Hanna Engineering Works.*

For Manufacturer's Information Circle No. 36, Page 7-8

CO_2 vacuum chamber gassing machine with operating cycle of 20-30 sec is said to produce higher and more consistent physical properties than hand gassing while using less gas and eliminating gassing heads or venting.

Unit cures uniformly including the edges, corners and deep blind recesses. Core can be cured in the box, on driers or stripped with equal facility. Can cure chamber filled with a number of cores on the same machine cycle time as individual cores while the hollowing out of large cores presents no gassing problems.

The treatment chamber (measuring 12x23x24 in.) is evacuated and



pressured automatically through two cycles as follows: first vacuum 3-10 sec; first pressure, 2-5 sec; second vacuum, 3-10 sec; dwell pressure, 10-30 sec.

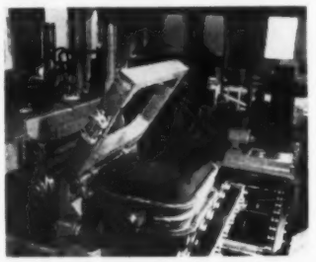
Wooden blank-off blocks are used in cage to decrease the volume to be evacuated and pressurized.

In mold production the gasser produces hard surfaces next to the pattern without vents or rigging. Over-

gassed hardnesses are economical since the CO_2 is not dissipated during longer curing interval. *Alphaco, Inc.*

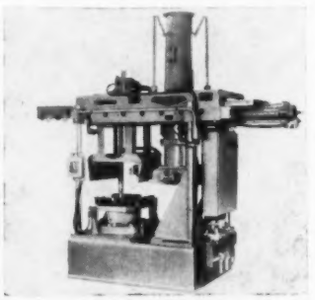
For Manufacturer's Information
Circle No. 37, Page 7-8

MOLDING MACHINE . . . compresses sand against pattern by applying air pressure to flexible rubber diaphragm which follows contours of pattern plate. Diaform pressure molding machine eliminates jolting, peening, ramming, tucking, and butting. Mold hardness is consistent and uniform. Molding pressure is controllable to any level up to the maximum of the air pressure available in foundry. Accurate castings result from sand flowability, molding pressure and elimination of side-wall friction between sand and pattern or sand and flask. *Eastern Clay Products Dept., International Minerals & Chemical Corp.*



For Manufacturer's Information
Circle No. 38, Page 7-8

MOLDING MACHINE . . . will blow-squeeze-strip molds automatically on preset time cycles. May also be manually operated. Predetermined volume of sand is squeezed into flask, pattern stripped automatically. *Osborn Mfg. Co.*



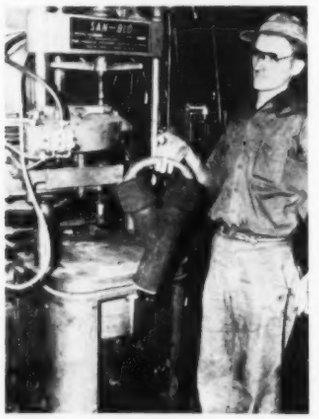
For Manufacturer's Information
Circle No. 39, Page 7-8

Core blowing machine speeds production through dial setting for any one of three types of operations: high pressure blow, regulated pressure prefill followed by high pressure blow, and regulated pressure pulsating blow. Design is said to blow cores harder with less core box wear. Also features quick-acting poppet-type blow valves with quick exhaust.

Unit will use any sand within practical foundry limits. Blower has large sand feed area combined with vibrator for improved magazine feed. Core boxes requiring a deep accurate draw are handled by a 10-in hydraulically-controlled draw with adjustable speed at start of draw and controlled finish. *Beardsley & Piper Div., Pettibone Mulliken Corp.*

For Manufacturer's Information
Circle No. 40, Page 7-8

MOLDING MACHINE . . . combines blow-squeeze operation with various types of flask-handling equipment for bringing empty flasks to the machine as well as removing finished molds.



Eliminates spilled sand and produces mold of uniform hardness and density. Ideal unit for making stack molds. Furnished with automatic controls for operating on repetitive cycle. *San-Blo Div., Federal Foundry Supply Co.*

For Manufacturer's Information
Circle No. 41, Page 7-8

MOLDING MACHINE . . . with hydraulic rollover, 10,000-lb capacity,

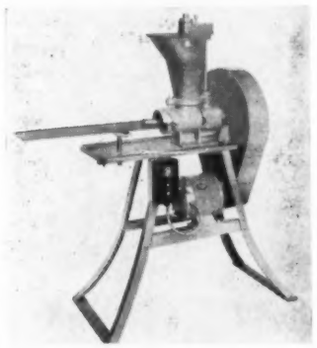
24-in. draw, handles flasks 28-76 in. deep. Automatic positioner and equal-

■ **Details on these products and processes are available to MODERN CASTINGS readers. See pages 7-8.**

izer eliminates manual clamping or blocking. Designed for multiple station molding units *Beardsley & Piper Div., Pettibone Mulliken Corp.*

For Manufacturer's Information Circle No. 42, Page 7-8

MOLDING MACHINE . . . extrudes cores 4-5 times faster than hand operations. Cores are accurate, cleanly vented through the center, require



no vents wires, said to cause less wear on tubes, dies, and conveyor screws. *Wadsworth Equipment Co.*

For Manufacturer's Information Circle No. 43, Page 7-8

Indiana Foundry Sets New All-Time No-Injury Record

■ More than 7,407,010 continuous man-hours without a disabling injury by the Haynes Stellite Div., Union Carbide Corp., Kokomo, Ind., has established an all-time no-injury record for the foundry industry.

According to the National Safety Council, selected foundries during this period 1954-1956, suffered 9.49 disabling injuries per 1,000,000 man-hours worked.

During 1956 the total cost of all work accidents in the industry was about $55 per worker. Approximately one-half of this represents wage losses, medical expenses, and overhead costs of insurance. The other half includes the monetary value of damaged equipment and materials, production delays, and time losses of other workers not involved in the accidents.

MORE FACTS on all products, literature, and services shown in the advertisements and listed in Products & Processes and in For the Asking can be obtained by using the handy Reader Service cards, pages 7-8.

obituaries

William H. Mason, 58, general superintendent and assistant to the president of Allyne-Ryan Foundry Co., Cleveland, died suddenly September 9. Beginning with the company forty years ago as a pattern-

W. H. Mason

maker, he became foreman of the pattern shop, progressing to general superintendent. He was well known in the foundry industry and a member of AFS for many years.

Helen Holland Voll, secretary and director of Sibley Machine & Foundry Corp., South Bend, Ind., for over thirty years, died August 26.

Franklin R. Hoadley, 67, who retired in 1955 as president of Farrel-Birmingham Co., died September 12 at Stonington, Conn.

A graduate of Yale University in 1914, Mr. Hoadley was a director in

F. R. Hoadley

the Gray Iron Founders' Society for many years, serving as president of that Society in 1934-35. He was ac-

tive in the National Foundry Association and served as president for three years, 1936-1939.

Charles J. P. Hoehn, 80, former AFS director and retired president of the former Enterprise Engine & Foundry Co., now a division of General Metals Corp., San Francisco, died September 14.

Born in San Francisco, Mr. Hoehn began his career at Enterprise in 1890 as a molder apprentice, progressing to journeyman molder, foundry foreman, vice-president and president.

His interests on the West Coast were wide and diversified. An active member of AFS for many years, he

C. J. P. Hoehn

served as director from 1937-1940 and as president of the Northern California Chapter and the Northern California Foundrymen's Institute. He was long active in the San Francisco Engineers' Club and was a past president of both the Pacific Coast Founders' Association and Manufacturers' Association of South San Francisco. He served as vice-president and president of Santa Fe Foundry Co., Richmond, Calif., Western Enterprise Engine Co., American Brake Shoe Co. of California, Enterprise Oil Burner Co. and Enterprise Engine Co.

Mr. Hoehn's son Charles, also a past chairman of the Northern California Chapter of AFS is president of Superior Electrocast Foundry Co., South San Francisco, Calif.

Mathew G. Sternberg, 68, former president of Continental Foundry & Machine Co. and consultant for Blaw-Knox Co., East Chicago, Ind., died September 4 after a short illness.

A native of Chicago, Mr. Sternberg was one of the outstanding steel foundry operations executives in the United States. He held membership in the American Ordnance Association, Steel Founders' Society of America, AFS, and was a founder of Kiwanis

continued on page 22

Obituaries

Continued from page 21

Boys' League in East Chicago.

Harold Sands Falk, 73, president of the Falk Corp., Milwaukee and past director of AFS, died October 7. He had been in ill health since last May.

Mr. Falk was born in Milwaukee and graduated from the University of Wisconsin School of Engineering in 1906 with a Bachelor of Science degree. In 1930 Marquette University conferred on him an honorary Master of Science degree for apprenticeship work, and an honorary doctor's degree was presented to him by the University of Wisconsin in 1948.

Beginning his career with the Falk Corp. during summer vacations, as foundry helper and other shop posi-

H. S. Falk

tions, he joined the company after graduation and progressed to foundry superintendent, becoming general superintendent of the entire plant. In 1922 he was named vice president and works manager and became president in 1940.

Mr. Falk was active in trade and technical association activities. He served on the Board of Directors of AFS from 1929-1932 and on various boards and committees of the National Founders' Association, Steel Founders' Society of America, American Society for Testing Materials, American Society of Mechanical Engineers, and many other associations. He was nationally known as a leader in vocational education and apprenticeship training and was the recipient of many honors and awards. In 1939 Mr. Falk received the John Penton Medal from AFS in recognition of his leadership in promoting general interest in apprentice training and especially foundry training.

Mr. Falk's civic activities included serving as president of the Milwaukee Vocational School Board in 1930 and the State Board of Vocational Education.

Flexible Conveyor System Increases Furnace Capacity

■ Three types of heat treating jobs are being performed in a single furnace at the Farmall Works of the International Harvester Co., Rock Island, Ill., through the use of a unique conveyor system.

A wide variety of tractor parts are produced at the Rock Island plant. A large number of small components must be heat treated in batches to obtain specific properties. A single gas-fired carbonitriding type of furnace was found most convenient but the difference in heat treating methods and loading posed two problems.

One was to develop a method for handling varied parts up to furnace entrance, the other to obtain various properties needed by suitable heat treatment cycles within the limitations of a single furnace. Cast high alloy trays, fixtures and furnace parts were used to aid in solving these problems.

Unique System

Farmall Works engineers developed a conveyor mechanism consisting of three types of sections: two fixed sections, one of which is permanently attached to the furnace entrance; a loading section raised or lowered pneumatically; and two movable or transfer sections moved laterally so that they can be aligned to the conveyor section attached to the furnace, or to the washing machine used to remove oil from parts after quenching.

This allows the accommodation of varying work loads, since a second carbonitriding furnace can be loaded with the same conveyor system.

In operation, cast high alloy trays are placed on the loading section in its lower position. Trays can then be loaded with such parts as can be accommodated on "Christmas tree" hangers. The operator raises conveyor and work load by moving a lever. The tray is first pushed to the permanent conveyor, then to the transfer section, and then into the furnace vestibule.

Three Operations

A batch-type furnace is used for carbonitriding but three different types of heat treating operations are performed. For parts where surface hardness must be closely controlled without producing scale a neutral gas atmosphere is used.

For parts that have important wear surfaces, the required hardness is achieved by carbonitriding.

For special types of parts, required surface hardness is obtained by a straight carburizing treatment eliminating ammonia from gas atmosphere.

the editor's field report

by Jack Salsbury

■ Are buckles, scabs, and metal penetration contributing to the delinquency of your quality control program? Since these are troubles inherent to the conflict of molten metal and silica sand molds you may be interested in learning that some foundrymen have found a substitute for silica sand that seems to be doing a good job in tough situations. The material is carbon sand—a low expansion, highly refractory molding material which is not wetted by molten iron. It can be bonded with the usual green sand additives and used for facing hot spots or making cores to withstand penetration of molten iron at high pressures and temperatures.

■ Borings and turnings from the machine shop are being eyed more favorably as a source of cheap remelt scrap. I recently observed at the Cadillac Motor Car Foundry a German-developed device for shooting cast iron chips and borings into the melting zone of their cupola. Shots of compressed air inject 4-lb batches of chips every six seconds through a special tuyere in the cupola. By injecting 5 to 10 per cent of the metal charge in this manner, the foundry is consuming 20 to 30 tons of cast iron chips a day.

■ The Wisconsin Centrifugal Foundry, Waukesha, Wis., is also tired of selling their turnings as low-priced scrap and buying it back at a higher price in the form of pig and ingot. In order to short-circuit this merry-go-round of scrap movement they installed a 4000-lb capacity, German-built, gas-fired, reverberatory-rotating furnace for remelting non-ferrous turnings generated in their machine shop. According to M. E. Nevins, President of Wisconsin Centrifugal, the cost of melting aluminum bronze turnings is only 7 cents per pound and melting loss runs about 9 per cent.

■ Guided missile emphasis coupled with cut-backs in piloted military aircraft are causing serious repercussions in the investment casting industry. Missiles use only one-tenth the weight of precision castings going into jet planes. The J-57 jet engine is said to contain $5000 worth of investment castings. Quick to respond to changing times, investment casters are already working closely with the automotive industry in developing low-cost turbine parts for the car of the near-future!

Pricing and Processes Discussed by N.F.F.S.

■ Principles of pricing in a changing market and foundry reports on molding processes were presented at the management and operating conference of the Non-Ferrous Founders' Society, Sept. 25, in St. Louis.

A. J. Messmer, Messmer Brass Co., St. Louis,used a fictitious foundryman to dramatize the problems faced on repeat orders during a rising metal market. Failure to take into consideration the actual cost of metal loss or shrinkage eventually led this foundryman into unprofitable operations. Mr. Messmer explained how to determine the actual cost of the metal loss.

Dr. J. P. McKenna, director, department of economics, St. Louis University, St. Louis, spoke on *"Pricing in a Changing Economy."* He stated that there should be a greater public insistence that the federal government handle the over all problem of inflation through monetary and fiscal policies, and leave the problem of pricing to the individual industries which must operate under the theory of supply and demand.

CO_2 Process

Observations on use of the CO_2 process were presented by W. L. Leopold, Northern Bronze Corp., Philadelphia, and Wm. Grimm, Wm. Grimm Foundry, Philadelphia. Mr. Leopold stated that his company produces 65 per cent of its cores by the CO_2 process. He said that they had been troubled with the softening of cores between production and use. The trouble was traced to extremely high humidity on certain days. It is believed that ice crystals were formed in the core during gassing, later melting to cause the softening.

Mr. Grimm emphasized that once a satisfactory procedure is established that consistency is paramount to achieve a satisfactory production schedule. On heavy cores the speaker recommended hard tucking in corners and pockets. Coke filler was suggested as a way to reduce core weight and to speed gassing.

Shell Molding Process

T. K. Hutchinson, Foundry Products Co., Alton, Ill., discussed the shell molding process. He stated that his company is holding ± 0.045 in. across the parting line in production. Foundry Products is pouring in horizontally-parted shells with gating similar to green sand. Mr. Hutchinson said that wetting agents cut dusting but reduce shell strength.

Circle No. 160, Page 7-8

pouring off the heat

add one

■ We have seen your article on water-cooled cupolas in the July, 1957 issue of Modern Castings. Please be advised that we have been operating such a cupola since 1943.

LEO J. T. BROM
Brom Machine & Foundry Co.
Winona, Minn.

This is the first addition to our list of water-cooled cupolas now operating in the U.S. We would like to hear from any other foundry that was not included in our list.—Editor.

troubled equation

■ An error seems to occurred in setting up the equations for our article on mold wall movement for the September issue. The equations for D and D' should actually appear as follows:

$$D=V-\frac{(d.1)\ (0.25W\text{-}1.1\sqrt{S})}{2.1+d}-1.3C$$

$$D'=V-\frac{(l.w.t.)\ (0.25W\text{-}1.1\sqrt{S})}{lw+lt+wt}-1.3C$$

J. F. WALLACE
Case Institute of Technology
Cleveland

subtract one

■ We regret to advise that one of the few foundries that have been in business in Vermont for over 100 years has decided to go out of business. Sargent Roundy & Co., Randolph, Vt., is taking the way of most small business today.

The obstacles to operation are enormous and small business, if it makes a profit, is not left with money enough after taxes to do much research or expanding. Another serious fact in the industry is the lack of young men wishing to learn the trade.

I am inclined to believe that it won't be more than about 10 or 15 years before the shops than can make small quantities of complicated castings will be hard to find.

NORMAN G. KNAPP
Gray Foundry, Inc.
Poultney, Vt.

Gray Foundry and Mr. Knapp must have the answers to some of these problems; the firm has been in business since 1828 *and Mr. Knapp has been with them since he graduated from college in* 1916.*—Editor.*

120 not 12

■ The practice of inadvertantly

dropping a zero can be understood, if not condoned, when figuring income tax or scrap reports; but, please, never on a production report!

We refer to the item on our new shell molding foundry appearing in the September issue. The statement relative to our hourly molding rate would be a bit more accurate if it read 120 molds per hour, not 12.

JOSEPH R. VINETTE
Evinrude Motors
Milwaukee

Sorry, Joe. We promise not to show any more bush league-type totals.—Editor.

Electric Furnace Meeting Features Casting Session

Seven technical papers on foundry practices will be presented Friday morning, December 6, as a part of the 15th annual conference of the Electric Furnace Steel Committee of the American Institute of Mining, Metallurgical, and Petroleum Engineers. The conference will be held Dec. 4-6 at the Penn-Sheraton Hotel, Pittsburgh, Pa.

Papers dealing with oxygen as an aid in electric furnace melting will be presented by J. Woodburn, Jr., Griffin Wheel Co., Chicago; G. Tracey, Canadian Steel Foundries (1956) Ltd., Montreal, Canada; and V. E. Belusko, Electric Steel Foundry, Portland, Ore.

W. A. Koppi, Lebanon Steel Foundry, Lebanon, Pa., will present *"Some Aspects of Melting Low Temperature, High-Impact Steels."*

Three papers will deal with spectrographic analysis in the foundry. These are: *"Fluourescent X-Ray Spectrographic Analysis,"* E. Anger, Duralloy Co., Scottsdale, Pa.; *"Standardization and Use of the Spectromet in a Steel Foundry,"* C. L. Richards, Adirondack Foundries & Steel Inc., Watervliet, N. Y., and Henry Levesque, Baird Atomic, Inc., Cambridge, Mass.; *"The Quantovac—A Direct Reading Instrument for the Control of Carbon,"* H. W. Calkins and M. F. Hasler, Applied Research Laboratories, Pittsburgh, Pa.

Stainless Alloy Resists High-Speed Air Friction

■ A high-strength stainless steel alloy, said to retain its heat-resisting properties at 1000 F, is expected to find applications in the aircraft and missile programs. The alloy, containing 15 per cent chromium, 7 per cent nickel, and a small percentage of molybdenum, is manufactured by Armco Steel Corp.

for the asking

MOLDING MACHINE . . . catalog, 36 pp, describes fundamentals of sand-slinger. Shows units in operation and outlines each of three basic types giving specifications.

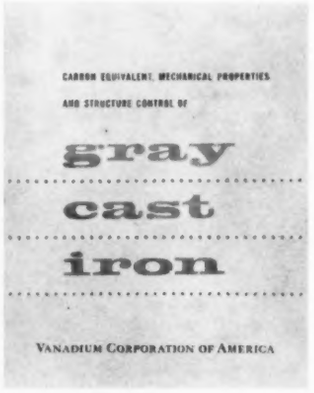
Engineering drawings clarify construction and operating techniques. Remote control, turntable, rollover-draw, illustrated with actual foundry illustrations. *Beardsley & Piper Div., Pettibone Mulliken Corp.*

Circle No. 81, Page 7-8

Which Core Process, reprint, 6 pp, discusses four major coremaking processes with a comparison of the advantages and the disadvantages of each. *Archer-Daniels-Midland Co.*

Circle No 82, Page 7-8

Gray iron structure control, mechanical properties and carbon equivalent



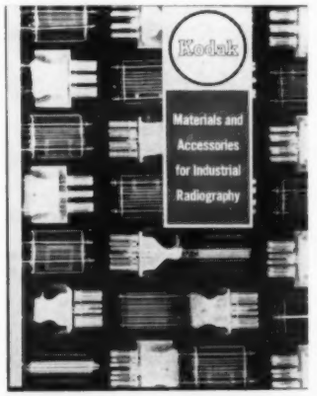
are described in 4-p technical article. *Vanadium Corp. of America.*

Circle No. 83, Page 7-8

Epoxy dermatitis booklet, 12 pp, lists 36 specific and practical rules for prevention. Recommendations are grouped under five headings: education of workers and supervisors; company housekeeping; ventilation; personal cleanliness; and the use of protective creams and clothing. Recommendations are based on practical experiences of epoxy manufacturers, public health agencies, and insurers. Free copies are available for distribution to all employees handling epoxy resins. *Milburn Co.*

Circle No. 84, Page 7-8

Industrial radiography materials and accessories booklet, 16 pp, includes sections on films, tables, chemicals,



and miscellaneous equipment. Illustrated with tables and graphs. *Eastman Kodak Co.*

Circle No. 85, Page 7-8

Permanent mold castings bulletin provides data concerning high tensile strengths available, reduced machining costs resulting from dimensional consistency, uniform structure allowing easy machining, and internal soundness minimizing the risk of loss after machining. In special folder for easy filing. *General Electric Co.*

Circle No. 86, Page 7-8

Patternmaking brochure describes modern facilities for production of wood, metal and plastic patterns, shell mold patterns and prototypes to meet the most exacting foundry demands. Equipment is described and pictured in both wood and metal pattern shops. *City Pattern & Foundry Co.*

Circle No. 87, Page 7-8

Grinding wheel selector, pocket size, circular slide rule, determines wheel rpm and correct wheel diameter in

inches or surface speed in fpm. Reference table shows recommended speeds for standard types and sizes of grinding wheels. *Simonds Worden White Co.*

Circle No. 88, Page 7-8

Chain block safety wall chart illustrates with do's and don'ts the proper procedures. On reverse discusses various hoisting equipment. Copies of chart available for displaying in every department using hoists. *Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc.*

Circle No. 89, Page 7-8

Refractory bulletin, 6 pp, describes a dry-press brick for high-temperature duty in industrial heat treating furnaces. Specific uses listed for various types of applications. Section devoted to shapes available. *Denver Fire Clay Co.*

Circle No. 90, Page 7-8

Klean Surf pamphlet tells how to stop veining and produce clean casting surfaces by adding iron oxide to foundry sand mixes. Said to prevent sand from abrupt volume changes when subject to heat shock. *American Colloid Co.*

Circle No. 91, Page 7-8

Industrial equipment handbook, 24 pp, lists lightweight storage and handling equipment such as bins, cabinets, racks, hand trucks and office equipment. *General Industrial Co.*

Circle No. 92, Page 7-8

Battery maintenance book, 44 pp, enables engineers, superintendents, foremen to organize plant training courses. *Gould-National Batteries, Inc.*

Circle No. 93, Page 7-8

Electrode pocket guide, 70 pp, has consumption calculator in tabular form giving data for determining consumption per linear foot in welding various

Circle No. 163, Page 7-8

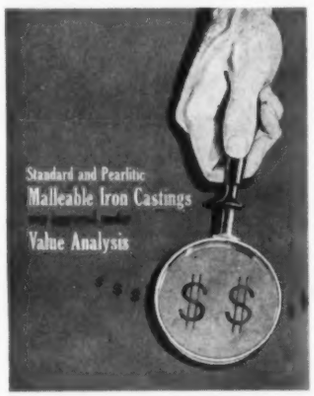
joint types. Describes each electrode, its color code, application, and best procedure for its welding. *Air Reduction Co.*

Circle No. 94, Page 7-8

Airless blast cleaning room catalog, 12 pp, discusses room capacities ranging from 6 to 100-ton. Also includes descriptions of spinner hanger cabinets, twin tables, double-door swing tables, and swing tables with air blast touch-ups. Introduces new type "M" abrasive blast wheel. *Wheelabrator Corp.*

Circle No. 95, Page 7-8

Malleable iron castings characteristics and advantages are outlined in 8-p brochure. Designed for use in cost reduction by purchasing departments, the brochure includes sections on machinability, cold forming, impact resistance, corrosion resistance, versa-



tility of castings, and range of sizes available. Also includes specification tables for standard and pearlitic malleable iron. Stresses advantages to be obtained by designers and purchasers of castings from consultations with foundry engineers. *Malleable Founders' Society.*

Circle No. 96, Page 7-8

Metallographic sample preparation using diamond abrasives is discussed in theory and practical application. Illustrated with sketches and photomicrographs. *Buehler, Ltd.*

Circle No. 97, Page 7-8

Collapsibility test for shell mold and core materials, formulated by AFS Shell Molding Materials Testing Committee, is presented in 4-p form. *Chemical Materials Dept., General Electric Co.*

Circle No. 98, Page 7-8

Crucible furnaces in the die casting and permanent molding industry are discussed in 4-p folder. Includes furnace room layout, melting and holding, advantages of refractory crucibles over iron pots, care and use of cru-

cibles, and furnace conversion from iron pot to refractory crucible. *Crucible Manufacturer's Association.*
Circle No. 99, Page 7-8

Crucible Melting Handbook, 4pp, covers crucible furnaces in die casting and permanent mold industry. *Crucible Manufacturers' Association.*
Circle No 100, Page 7-8

Graphite and carbon products bulletin, 8 pp, gives application information, key characteristics, and tabulated information on grades, sizes, and properties. Charts illustrate physical and chemical properties that solve high temperature problems in the foundry. *Speer Carbon Co.*
Circle No. 101, Page 7-8

Stainless steel welding booklet, 20 pp, answers 22 questions most commonly asked in foundry operations. Drawings and photographs used for clarification. *Arcos Corp.*
Circle No. 102, Page 7-8

Storage bin bulletin, 2 pp, describes construction and application of superstrong concrete stave construction for holding bulk materials such as sand. *Neff & Fry Co.*
Circle No. 103, Page 7-8

Metal cleaning compounds, 52-p booklet, describes alkaline, acid emulsion and detergent cleaners. *E. F. Houghton & Co.*
Circle No. 104, Page 7-8

Steel casting repair and fabrication welding recommendations are included in 52-p reference manual developed at Battelle Memorial Institute. This newly revised manual available for your files. *Tempil Corp.*
Circle No. 105, Page 7-8

Product research and development brochure, 20 pp, lists specific fields in which its laboratories are equipped to perform research and development. *Franklin Institute.*
Circle No. 106, Page 7-8

Industrial installations brochure lists services available and shows foundry construction projects completed as well as other heavy industrial installations. *Commercial Contracting Corp.*
Circle No. 107, Page 7-8

Bismuth alloys, 4-p bulletin, describes low melting temperatures and controlled shrinkage characteristics that make these alloys valuable for molds, cores, models, and patterns. *Cerro De Pasco Sales Corp.*
Circle No. 108, Page 7-8

Coatings for crucibles, ladles, skimmers, and pouring spouts stop metal from sticking. Any metal skull solidi-

fying on surface of refractory items peels off easily. *Michael Scott Co.*
Circle No. 109, Page 7-8

Control handle bulletin, 4 pp, illustrates new unit which can be installed on electric walk-type materials handling trucks. Operation of truck is smoother, simpler, and safer. *Lewis-Shepard Products, Inc.*
Circle No. 110, Page 7-8

Lift truck, towing tractors, and platform truck specifications are contained in 4-p bulletin with charts and tables showing models, capacities, specifications, and dimensions. Designed for low maintenance. *Buda Div., Allis-Chalmers Mfg. Co.*
Circle No. 111, Page 7-8

MOLDING MACHINE . . . literature available. Shell molding equipment, core blowers, core draw machines, combination core blower and draw machines, moldng machines and custom-built equipment are covered in complete set of catalogs. *Sutter Products Co.*
Circle No. 112, Page 7-8

Abrasive mounted wheel catalog, 8 pp, includes all shapes and sizes in two series, illustrated in actual size with dimensions indicated. Includes new standard suffix designations for mandrel projections and diameters. *Simonds Abrasive Co.*
Circle No. 113, Page 7-8

Fork lift truck brochure, 6 pp, details specifications, capacities, and operating data on model with 10,000 lb capacity at 24-in. load center. Available in gasoline, LP gas or diesel models. *Allis-Chalmers Mfg. Co.*
Circle No. 114, Page 7-8

MOLDING MACHINE . . . catalog, 8pp, describes portable and stationary jolt squeeze types and conversion to vibrating squeeze machines. Additional information available on mother molding machines, core blowers, and shell machines. *Osborn Mfg. Co.*
Circle No. 115, Page 7-8

Lamp catalog, 72 pp, covers filament, fluorescent, infrared, mercury, sun, germicidal, and ozone types. Each application is illustrated with descriptions given for various lamp styles. *General Electric Co.*
Circle No. 116, Page 7-8

Shell molding, its fundamentals, advantages and disadvantages, and an evaluation of its future are contained in 1-p monthly newsletter. *J. David Johnson Co.*
Circle No. 117, Page 7-8

Gray iron industry in general and castings in particular are examined

in 20 pp booklet which gives advantages of gray iron castings and step-by-step procedure in manufacturing. *Coke & Iron Div., Pittsburgh Coke & Chemical Co.*

Circle No. 118, Page 7-8

free films

■ Motion pictures and other visual aids based on foundry processes and supplies are also yours *for the asking*. These films are suggested for formal or informal training groups. The owners of films listed in this column will send booking request forms to MODERN CASTINGS readers who circle the appropriate number on the Reader Service card (pages 7-8).

Technique for Tommorrow, 16 mm, black and white, sound, 20-min. running time. Shows processing operations at Cleveland Foundry. *Training Div., Ford Motor Co.*

Circle No. 119, Page 7-8

Laying Out Small Castings, 16 mm, black and white, sound, 16-min running time. *United World Films, Inc.*

Circle No. 120, Page 7-8

Automation as Applied to Coremaking, 16 mm, silent, color, 15-min running time.

Shows use of 5-station automatic coremaking machine. *Cadillac Motor Car Div., GMC.*

Circle No. 121, Page 7-8

Iron-Carbon Alloys, 16 mm, color, sound, 30-min running time. Shows use of iron-carbon equilibrium diagram. *American Society for Metals.*

Circle No. 122, Page 7-8

Pressure Cast Matchplates, 16 mm, color, sound, 25-min running time. Shows pressure-cast method of aluminum matchplate manufacture in plaster molds. *Scientific Cast Products Co.*

Circle No. 123, Page 7-8

Traveling with a Grain of Sand, 16 mm, color, 20-min running time. Shows mining of silica sand and its relation to foundry practice. *American Silica Sand Co.*

Circle No. 124, Page 7-8

X-Ray Inspection, 16 mm, sound, 21-min running time. Shows the use of radiographs in industry, procedures, interpretation. *United World Films, Inc.*

Circle No. 125, Page 7-8

Giving A Shop Demonstration, 16 mm, black and white, 2 reels, 16-min running time. Illustrates proper technique in conducting demonstration. Step-by-step sequence is shown. *Jam Handy Organization.*

Circle No. 126, Page 7-8

Metals Division of S.L.A. to Meet in Chicago, Nov. 6-8

■ The Special Libraries Association's metals division will meet in conjunction with the Second World Metallurgical Congress and the American Society for Metals annual meeting. All sessions will be at Armour Research Foundation.

Tours will be conducted through the nuclear reactor of Armour Research Foundation laboratories, the International Harvester Co. research center, as well as several other research organizations in the Chicago area. A tour will also be made of the John Crerar Library.

A display of technical publications will be exhibited at the National Metal Exposition to be held at the International Amphitheater, Chicago, Nov. 4-8.

Discussions will center around daily themes. Wednesday will be devoted to "Progress in Non-Ferrous Metallurgy," Thursday to "Progress in Ferrous Metallurgy," and Friday to "International Aspects of Literature Research."

Wednesday's program: *"Recent Development in Non-Ferrous Metallurgy,"* Dr. D. W. Levinson, supervisor, metals research department. *"The Report and Document Library at Armour Research Foundation,"* Mary Patricia Murray, report and document librarian. *"Design of a Punch Card System as an Example of Literature Research at Armour Research Foundation,"* Ann P. Wennerberg, assistant supervisor, literature research section.

Thursday: *"Recent Advances in Ferrous Research,"* Dr. R. H. Aborn, director, Edgar C. Bain Laboratory for Fundamental Research, U. S. Steel Corp. *"Metallurgy and Physics,"* Dr. D. S. Lieberman, department of mining and metallurgical engineering, University of Illinois. *"Developments in High Temperature Alloys,"* M. C. Metzger, Universal Cyclops Steel Corp.

Friday: *"The Technical Library and Information Services for the British Metallurgical Industries,"* Anthony Post, joint assistant secretary, The Iron & Steel Institute, London, England. *"Activities and Functions of the Centre de Documentation Siderurique,"* Dr. Marc Allard, director general, Institute de Recherches de la Siderurique and Max Dupont, manager, Centre de Documentation, Siderurique, St. Germain-en-Laye, France. *"Bibliographic Services within Aluminum Industrie,"* Dr. Ernst A. Bloch, director of research, Aluminum-Industrie AG, Neuhausen am Rheinfall, Switzerland. *"Importance of Documentation,"* Frank T. Sisco, director, Engineering Foundation, New York.

Predict Increasing Volume for Die Casting Industry

■ New production developments for the die casting industry were emphasized at the annual meeting of the Die Casting Institute held during September in Chicago.

Improved lubricants and lubricators, new temperature control systems, more durable cores, and possible new die materials were among subjects discussed.

The first day of the two-day meeting was devoted to present and future activities of the institute's die casting research foundation. Heat-checking in dies is one of the projects under investigation. It is anticipated by the foundation that an understanding of this difficulty may lead to die casting brass and ferrous metals.

Speakers predicted that increased usage of die castings in 1958 autos, home appliances, and business machines will boost the industry's production to an all-time high. The 1957 consumption of aluminum by die casters is expected to be 414,000,000 lb. Of this, 385,000,000 lb represents aluminum die castings and the remainder used for alloying in zinc die castings represents a 5 per cent increase over 1956.

C. J. Sheehan

C. J. Sheehan, Die Casting Div., Aluminum Co. of America, Garwood, N. J. was re-elected president. C. L. Anthony, Hoover Co., North Canton, Ohio, was re-elected vice-president; D. Laine and W. J. Parker, American Die Casting Institute, were re-elected secretary and treasurer.

Zinc consumption for die castings in 1958 is expected to equal the 1956 use of 362,500 tons. The industry's record consumption was during 1955 with 410,000 tons, due in part to a record auto year.

AUTOMATION IN THE FOUNDRY

Automation is now superseding mechanization in production foundries. As developments in automated processing occur, Modern Castings will bring the news to its readers.

MEET the ELECTRONIC SANDMAN

J. R. YOUNG / *Senior Process Engineer*
Cadillac Motor Car Div., GMC
Detroit

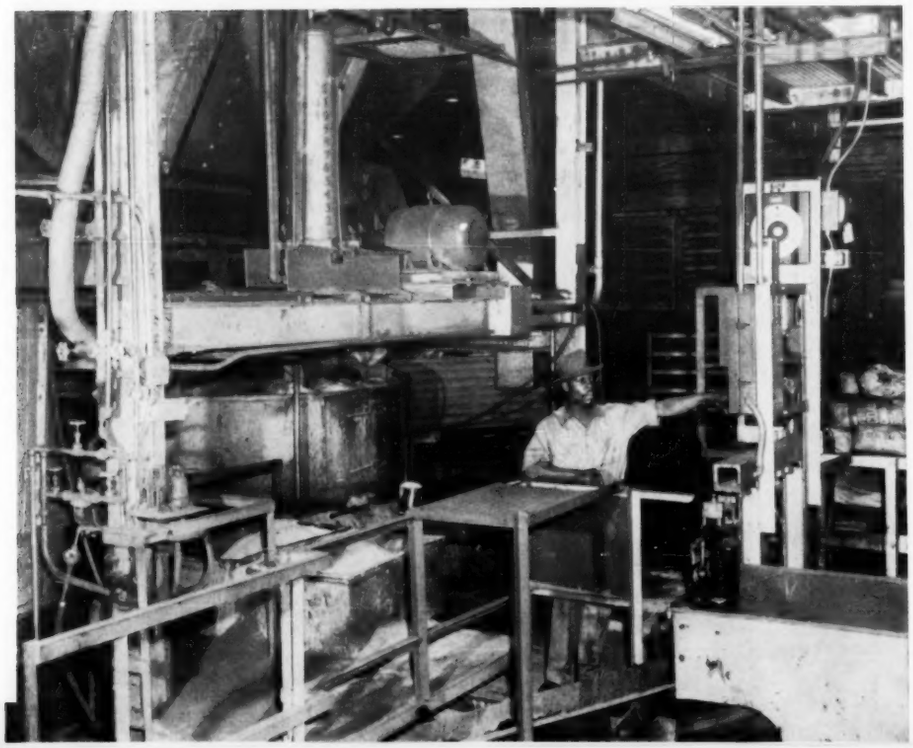
Automatic control of sand moisture gives Cadillac foundry closer control of variables

The dependence of molding sand properties on moisture content makes it paramount to have this ingredient constantly under accurate control. Electronic moisture control is proving to be the answer to this problem in automated sand systems.

Moisture content of molding sand has long been a controversial subject to foundrymen, with each having his own convictions and ideas. One point of agreement is the need to control moisture within specified limits. It is well to note that all measurable sand properties vary with changing moisture except grain size distribution, carbonaceous material and clay content. The following list indicates examples of these changes within normal working ranges.

1. **Green strength**—Excessive moisture will reduce both green compressive and green shear strength. Molding sands will show greatest strength when moisture content is slightly under temper and sand is on the dry side.
2. **Deformation**—Moisture increases deformation rapidly. This could lead to washes, swells and overweight castings.
3. **Dry strength**—Increases rapidly with increasing moisture.
4. **Hot strength**—Increases rapidly with higher moisture.
5. **Permeability**—Decreases after the temper point has been reached.

Automation gives better control by eliminating human errors.



Molds of a sort can be produced from sand that is too wet, but not from sand that is excessively dry. Without proper control, sand will usually be worked too wet in order to avoid dry batches. When moisture control has been achieved, sand may be worked on the dry side with attendant improvement in casting quality. This will mean easier cleaning, improved dimensional tolerances and a more salable casting.

In view of the foregoing facts, moisture control was given prime attention as a means of controlling casting quality. Four approaches must be considered, either separately or in combination, to achieve this control.

1. Segregation of spill and shakeout sand.
2. Tempering bins for mulled sand.
3. Cooling of return sand.
4. Automated water additions.

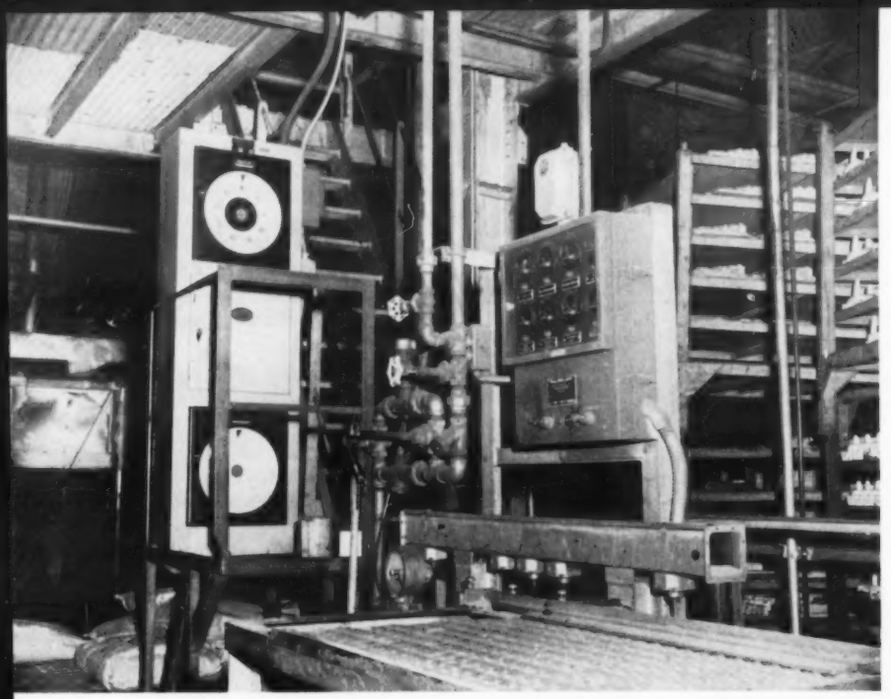
Approach No. 4 was used as a starting point for control with the purchase of an automatic moisture control unit.

The automatic unit was installed on a molding line which produces cylinder blocks and heads. Since these two castings are the basic components of the engine, both their quality and cost are of prime importance. The basic operation of the unit takes into consideration both moisture and temperature of returned sand as it enters muller to be reconditioned and the time factor involved before the sand is actually used.

The sand system uses a muller, hand addition of dry additives, the moisture control unit, and an aerator after the muller. Spill and shakeout sand are returned on a common belt to a storage bin. The moisture control unit is comprised of three electronic circuits coupled together by mechanical linkage.

Unit automatically computes the volume of water necessary to raise moisture content of the given volume of sand to any predetermined value. It utilizes the difference in the dielectric constant of sand, which is approximately 2 for dry sand, and water which is 80.

The return sand moisture and temperature will each have a capacitance value which is electrically fed into one side of a capacitance-inductance bridge. In order to balance the bridge circuit, the water necessary to be added is converted into a capacitance value by a probe



Master control panel utilizes eight timers for mixing additives.

in the water tank and fed into the other side of the bridge. Proper amount of water to balance bridge will be the proper amount to raise moisture to the preset value.

Water is then discharged automatically into the muller by a unit which controls all cycle times. The schematic diagram indicates the general arrangement of unit. A photograph shows the unit installation.

Results obtained from the installation thus far indicate a 10 per cent increase in control accuracy. Proposed minor modifications are expected to increase this control to ±0.2 per cent. Moisture control, at the proper level, will not only reduce defects from this cause, but, control of this one variable permits defects from other causes to be studied and corrected sooner. Consequently the sand muller operator has been relieved of one operation so more time is available for making other sand additions more carefully.

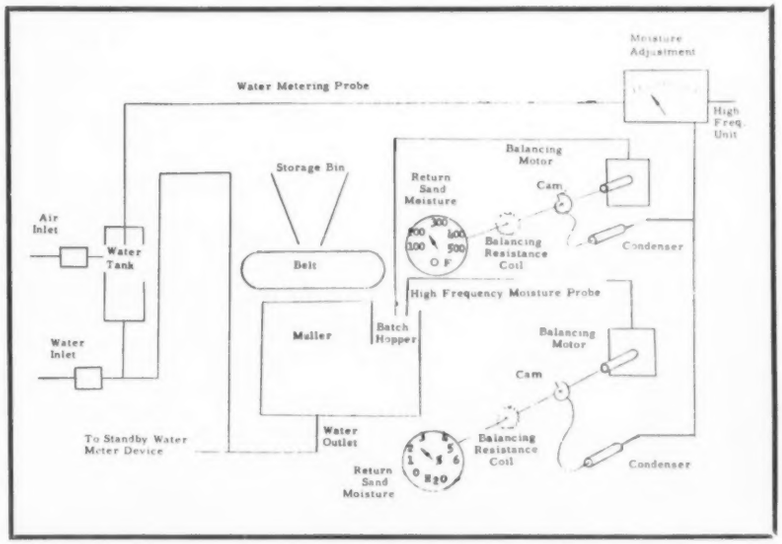
The term "electronic" is relatively new in the castings industry and deserves special note from a maintenance standpoint. With the installation and primarily the maintenance of this type of equipment, this factor must be considered. Requirements of the industry will be more dependent on complex control equipment to achieve the necessary casting quality. The equipment manufacturers have personnel capable of utilizing this new development in producing various pieces of control equipment.

The castings industry must supply personnel capable of maintaining this equipment to achieve all of its potential. Manufacturers cannot be expected to completely service this equipment for all users. Training programs and technical information are highly beneficial in acquainting personnel with the equipment, but it is the job of the industry to attract people of the necessary caliber and interest to take advantage of developments.

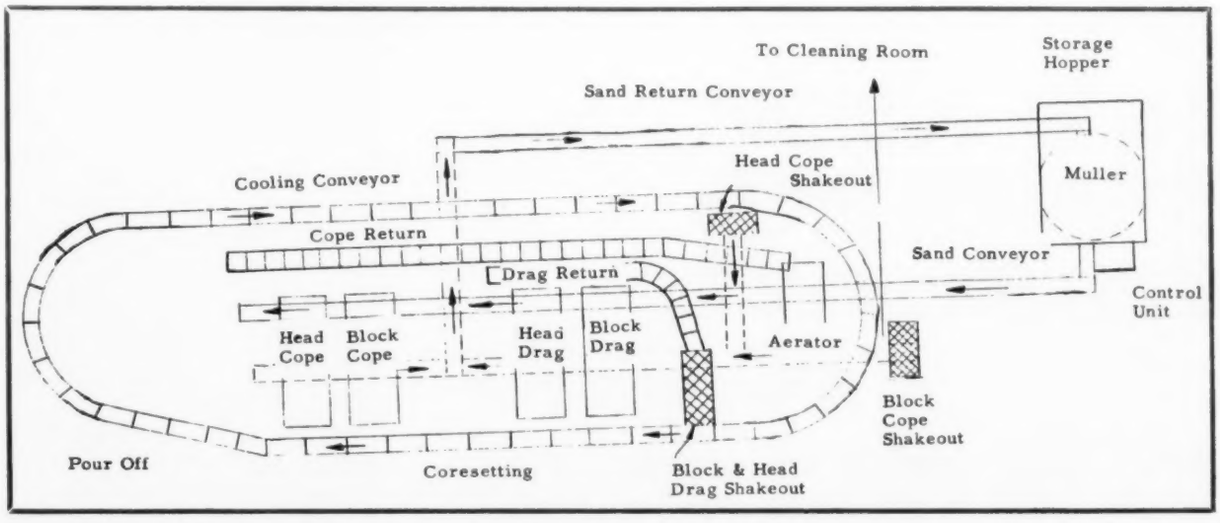
We might expect a man to weld a broken bar in a shakeout, but can this same man check an electronic circuit for a short or worn tube? Control equipment without the technical talent required to use it is not only a waste of money, but can be highly detrimental to the process.

The castings industry's use of electronic equipment of the type mentioned is something which we all must accept. Throughout industry we see more and more evidence of electronics playing an ever-increasing role and we must not be the "perennial bridesmaid." These developments have reached a point where it is not a question of "can we afford it," but rather, " can we afford not to accept the potential value and resultant better quality which could mean the acceptance of castings in the future?"

A limited number of tear sheets are available by request.



Control unit uses electronic circuits coupled by mechanical linkage.



Vacuum tubes have replaced human judgment for the control of moisture in sand used on this molding line.

Molten stainless is tapped from 600 lb high frequency induction furnace.

SMALL FOUNDRY SPECIALIZES AND GROWS

Alloy Steel Casting Co. concentrates on top quality stainless steel castings

DON VOLK / *President*
Alloy Steel Casting Co.
Southampton, Pa.

Only in the United States could a company have the phenomenal growth pattern demonstrated by the Alloy Steel Casting Co., Southampton, Pa. By specializing in stainless steel castings our company soon discovered that industry needs were rapidly growing. And industry demands for castings of the quality produced by Alloy Steel literally forced us into an almost continuous expansion program. Our chronological growth pattern follows:

1949—Began operations in Willow Grove with 3 employees working in a 1500-sq ft foundry equipped with 130-lb capacity indirect arc furnace.

1951—Employees numbered 12; foundry area increased to 5550 sq ft; and melting capacity was improved with a 300-lb induction furnace.

1953—Number of workers doubled and cramped quarters prompted purchase of a 6-acre parcel of ground in Southampton.

1955—New foundry with 11,800 sq ft of floor space erected and occupied by 28 men.

1957—Employment increased to 87 and another 11,800 sq ft added to double the working area.

Expansion of plant facilities was justified by casting sales which in 1955 were double those of 1954. This outstanding performance was exceeded in 1956 when the sales increased almost threefold from 240,000 lb to 640,000 lb.

Induction Melting

Probably the factor most responsible for this growth pattern has been specialization. Specialization in the production of stainless steel castings has been tailored specifically to supply the exacting quality required by many users of specialty castings. The new foundry can produce castings weighing from 1 ounce to 600 pounds in any of the high-alloy, heat-resisting and corrosion-resisting alloys.

The heart of our stainless steel production is the modern melting department. A bank of four, high-frequency induction furnaces are

located on one side and well centered in the main foundry bay where all molding takes place. Two of the furnaces are rated at 600-lb capacity and two at 300-lb capacity. Capacity ratings are based on carbon steel.

Furnaces are lined with neutral or slightly basic linings. Uniform heat quality is assured by using a charge consisting entirely of ingot iron, nickel, ferro-alloys and well identified return gates and risers. For the 300 series of stainless steels *the carbon is held unusually low in the range* 0.01 *to* 0.04 *per cent.*

When the melted charge is ready, 80-lb batches are tapped into small, preheated teapot ladles supported by a two-man bail. *Power is kept on during pouring for two reasons. The metal does not lose temperature and stirring action of the induction current keeps slag to outside of furnace so very little carries over into ladle.*

The motor generator equipment was installed to permit simultaneous operation of one 600-lb and one 300-lb furnace. Since these two furnaces hold more than their rated capacity and a batch can be melted in less than an hour, the melting department capacity exceeds 1000 lb per hour. No time is lost between heats. While two furnaces are melting the other two are being charged. Operating two shifts, we can pour 8 tons of steel per day. Furnace linings last anywhere from 60 to 100 heats.

Molding

Molding is done on five jolt-squeeze type machines handling flasks up to 16 x 18 in. The green sand mix uses a base of No. 80 silica sand to which is added 3½% H_2O, 6% bentonite, 1-2% cereal, and 10-15% bank sand. Zircon sand facing for hot spots in molds prevents metal "burn-in."

Cores are made with many of the new materials and processes on the market such as CO_2, cold-set, and catalyzed corn sugar.

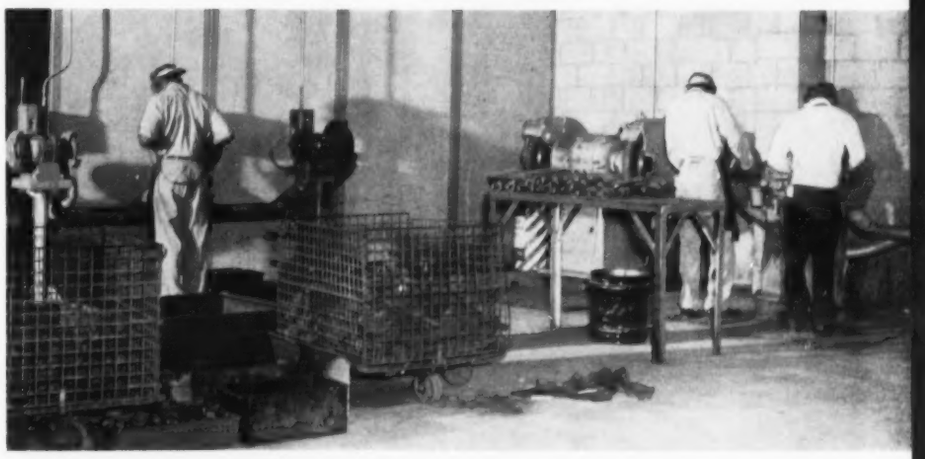
Cleaning

After shakeout castings are shot blasted and inspected. Early inspection eliminates scrap before any further operations are performed on the castings.

Gates and risers comprise 50-65 per cent of total metal cast. Their removal entails considerable time and equipment. Large sections are cut through with a special torch that blends oxygen, acetylene and iron-oxide powder into a 5000-6000 F cutting flame. Small gates and risers can be removed with our 20-in. cut off wheel. A high-speed band saw is also utilized for removing risers up to 1½-in. diameter. Arc-air torches are best for trimming and scarfing. And grinding wheels add the finishing touches.

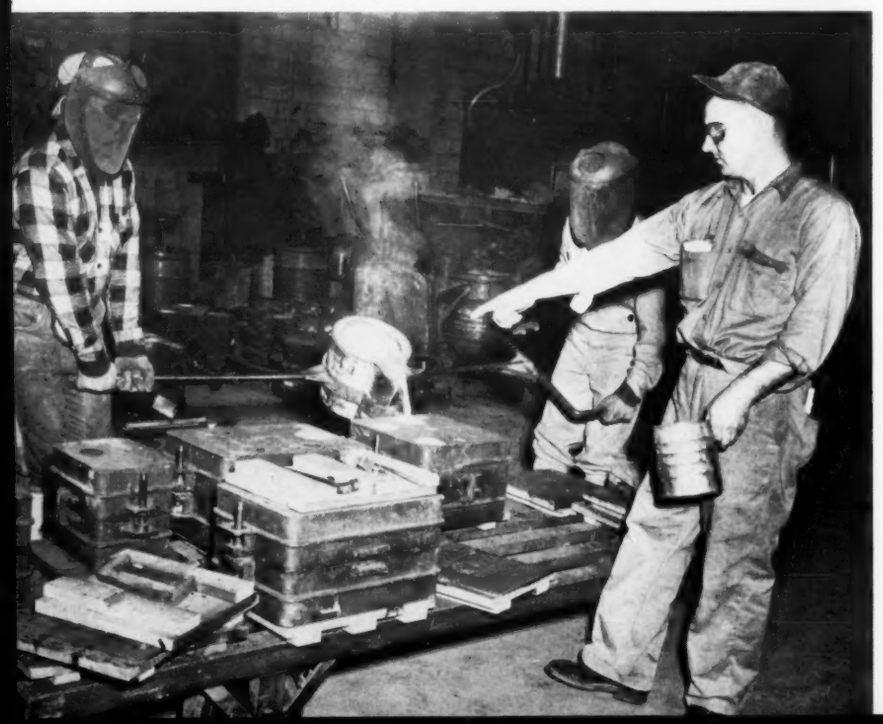
Cut-off wheel for tough gates.

Grinding rough edges and fins.



Final touch-up grinding operations performed before shipping castings.

Teapot ladle helps keep dirt from flowing over into green sand molds.



Heat Treatment

All castings must be given a solution anneal heat treatment. A labor-saving rig for handling castings in this department was designed by men in the shop. A fork-lift truck was modified by installation of a boom and hook. This mobile crane is used to lift a stainless steel plate loaded with castings onto a 4-wheel truck.

The truck wheels set in two rotating two eccentric cams so that truck rolls into the hot furnace. This rig has since been replaced with a permanent overhead hoist arrangement. Castings are heat treated at 1950-2050 F in a neutral atmosphere to remove carbon from grain boundaries by solution into austenite.

After solution annealing the tray of hot castings is rolled out of furnace, lifted by overhead crane and quenched immediately in a water bath to retain the carbon in austenite. *This heat treatment gives stainless its maximum corrosion resistance, softness, and ductility.*

Quality Control

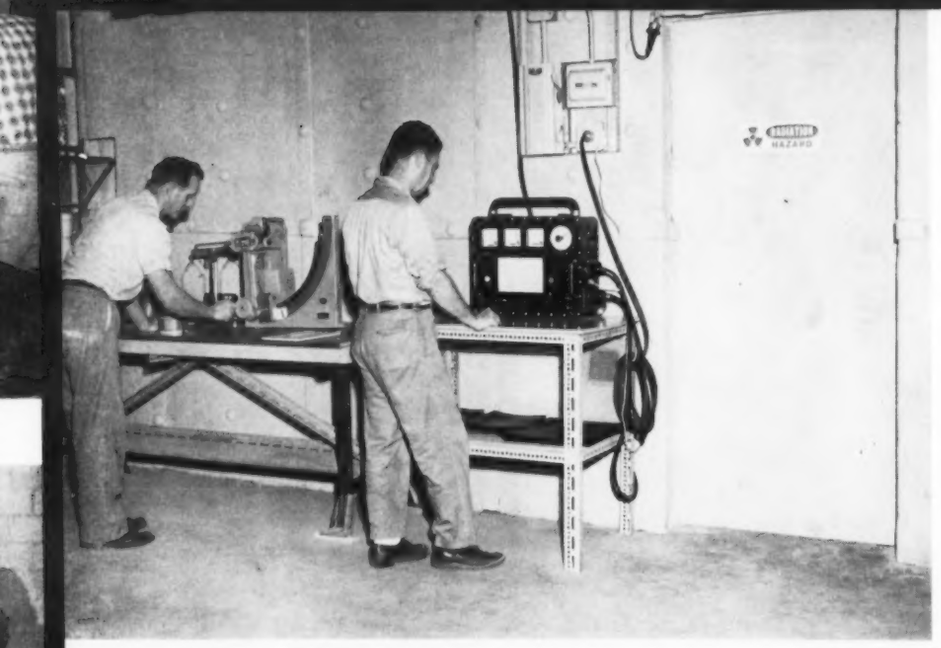
Our molding and core sand is controlled by a complete line of sand testing equipment plus a portable moisture tester which is used continually by the sand operator.

The recent installation of a 260 KV x-ray unit assists in the production of sound castings and permits a continuous check of the foundry gating and risering.

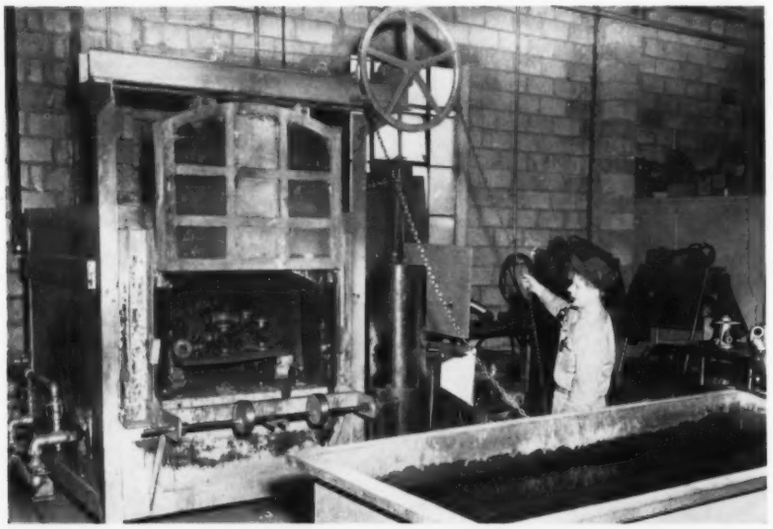
The completion of our wet chemical laboratory further insures meeting the standards required by customers' specifications.

Heats can be held in the induction furnace until analysis is verified.

A recently added customer service that is improving Alloy Steel

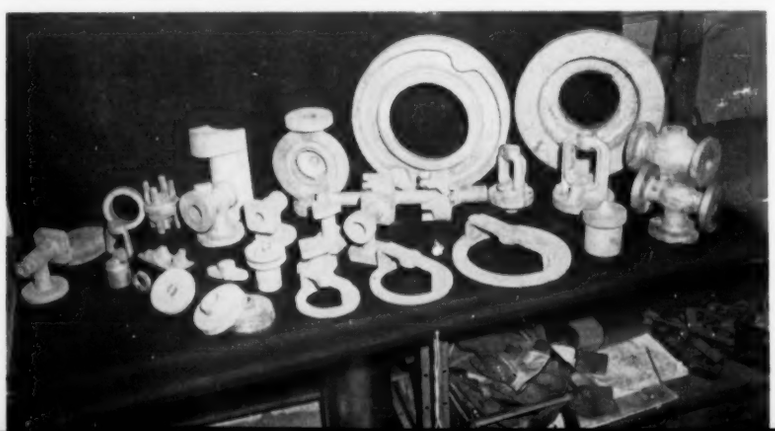


Quality castings require sand control and x-ray examination for proof.



Careful heat treatment produces uniform, optimum physical properties.

Castings meeting severe service requirements expected of stainless.

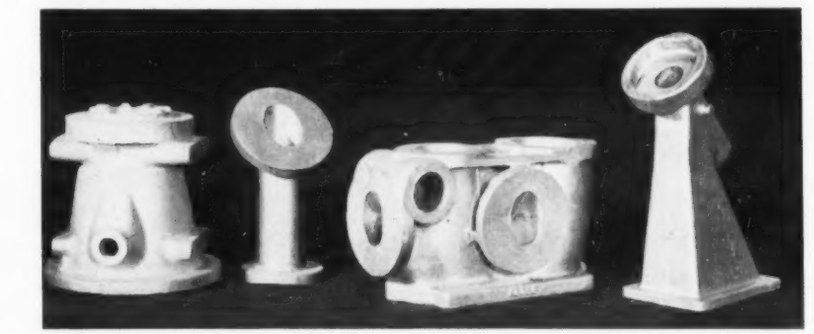


Casting's operation is a new pattern shop. *Designed to use epoxy resin pattern materials, we can now eliminate many delays formerly experienced when conventional wood and metal pattern equipment were needed.*

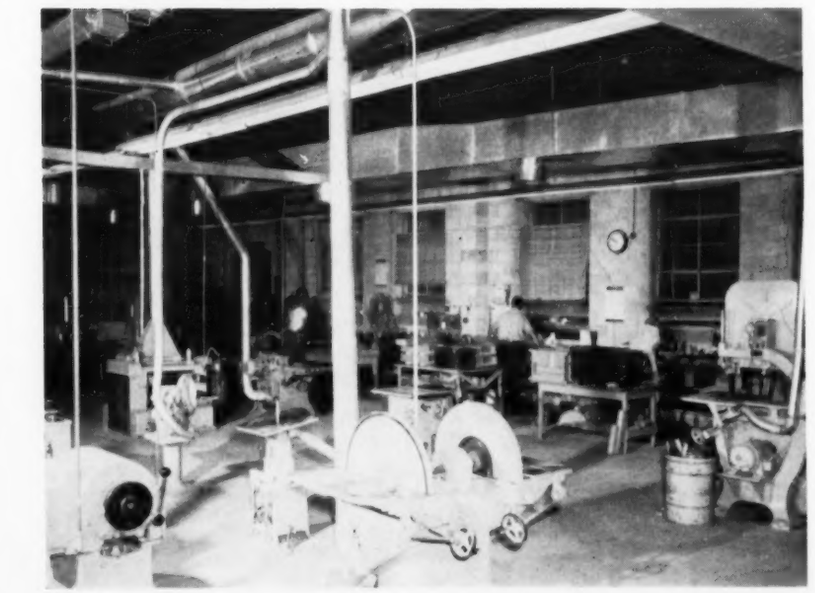
From one working pattern many duplicates can be quickly and inexpensively reproduced in epoxy resin containing steel filler. As a result, multiple casting match plates can be made at a fraction of manhours and cost formerly entailed.

Plastic match plates are rapidly and inexpensively produced in the following operations. The master pattern is bedded in modeling clay. The parting line is established by careful removal of clay. A flask is placed around pattern and filled with pattern plaster. When the plaster has set, clay is removed from other half of pattern and plaster poured over it. The two plaster mold-halves are removed from the pattern. Gates and risers are cut. Between the two mold halves is placed a blank aluminum follow board with center area cut out. Epoxy resin is poured into sprue, filling mold cavity and welding to follow board. Final result—a plastic match plate. By continually adapting new processes, new materials, and new ideas to better serve our customers' needs, we feel that Alloy Steel Casting Co. will continue to prove that a small specialized foundry can succeed in this highly competitive industry.

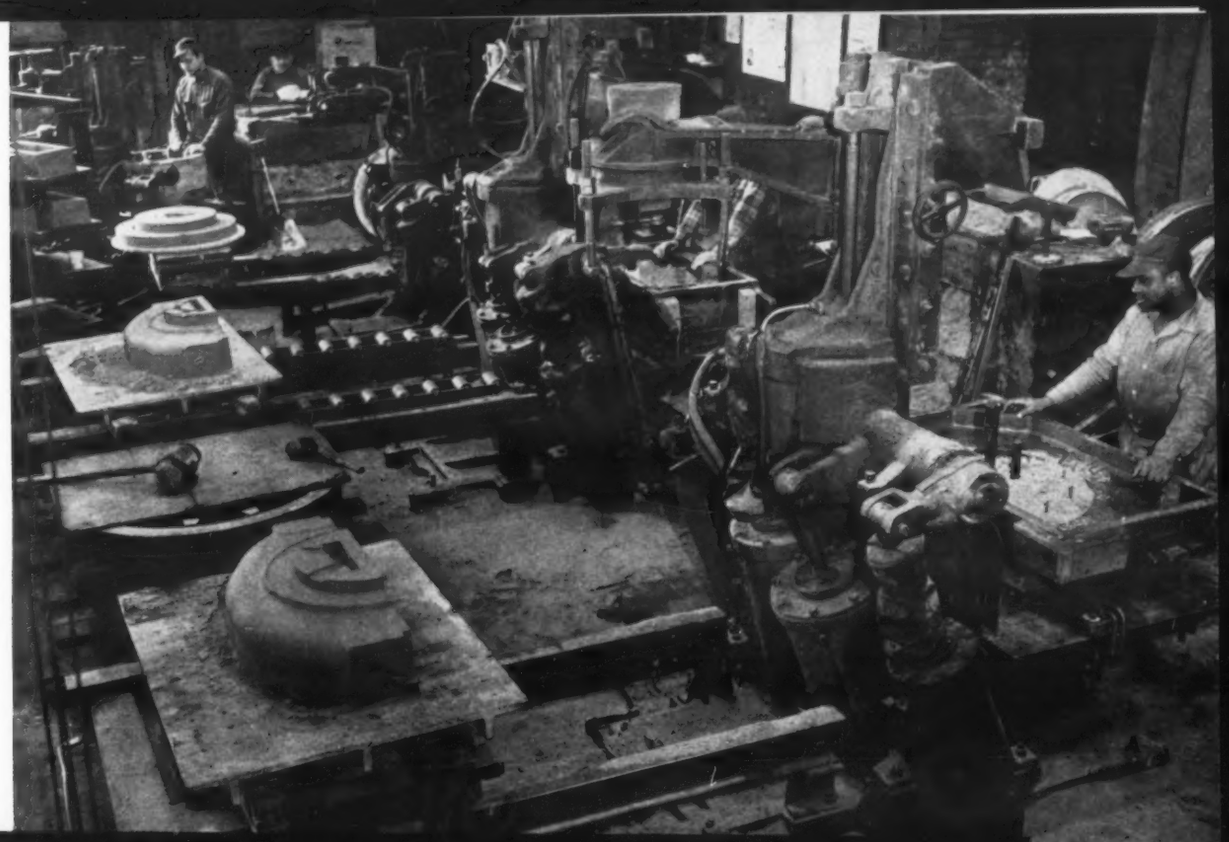
■ Tear sheets of this article may be obtained by writing MODERN CASTINGS.



These stainless steel castings exemplify some of complex cores needed.



New patternmaking shop is equipped to work with wood and plastic.



3 STEPS to PROFITABLE USE of MOLDING MACHINES

J. M. LEAMAN / *Research Engineer*
Lebanon Steel Foundry
Lebanon, Pa.

Powered machine molding of one type or another is here to stay. Approximately 10,000 machines have been installed in U.S. foundries since 1949 and more than 17,500 since 1944. Moreover, 63 per cent of all molding machines are less than 10 years old.

DR. D. C. EKEY / *Prof. of Ind. Eng.*
Georgia Institute of Technology
Atlanta, Ga.

The ability to select the proper molding machine for the particular jobs being produced in an individual plant can be a major factor in making a profit in a competitive market. All foundrymen are aware of labor cost factors as well as quality factors which necessitate even greater advance in the design of molding machines.

What is meant by the term "molding machines." A molding machine can adequately be defined as a device consisting of several interrelated parts which transmit and modify various forces and motions so as to aid in the construction of a mold. Molding machines have one or more methods of compacting sand, and may mechanically perform some allied operations such as roll-over, pattern draw, strike-off, clamping, flask handling, and mold handling.

Every machine is designed to do some jobs best. It is your problem to select the machine which will do your jobs most economically. Then you must fit the machine into the flow of production.

step 1 . . LEARN HOW MACHINES RAM SAND

Basic differences in mechanical actions of molding machines result in molds with different characteristics

Molding machines ram sand to form molds by using one of three basic mechanical actions: jolting, squeezing, or slinging. Each of these actions produces a mold with a different characteristic density. Understanding these characteristics is the first step toward profitable use of molding machines.

- **Jolting.** Produces molds with sand density greatest around pattern.
- **Squeezing.** Produces mold with greatest sand density on side away from pattern.
- **Slinging.** Molds have uniform and consistently high density.

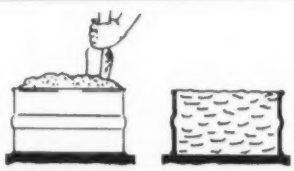
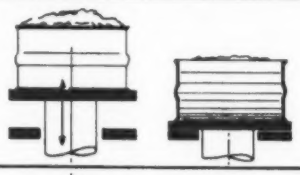
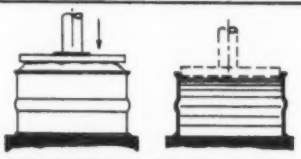
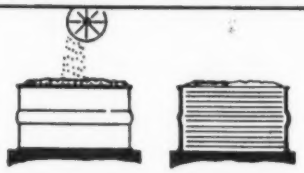
Since hand ramming preceded machine molding let us first consider what happens to the sand rammed by hand. This method produces variable hardness as indicated by the "hardness isofirms" in box.

Hardness isofirms are lines or planes of equal mold hardness. Smaller spacing between lines indicates higher hardness. While hand ramming is the most flexible method, it is uneconomical today except for rare instances of low production specialty work. Hand ramming requires skill and training, but the cost of equipment is low.

Air ramming, which is closely related to hand ramming, is frequently used in jobbing shops to supplement other molding machine operations such as straight jolting.

Next consider jolting (bumpers or jarrers). The action of a piston supported table compacts the sand. Pattern and sand are placed in a flask on the table. Table is lifted mechanically and let fall until brought to a sudden stop by the bed plate of machine. The inertia of sand gained during the fall tends to continue after the sudden stop, thus compacting the sand. Sand density varies principally with height of drop and depth of sand greatest around the pattern and at the parting plane, as indicated by the isofirms in above box.

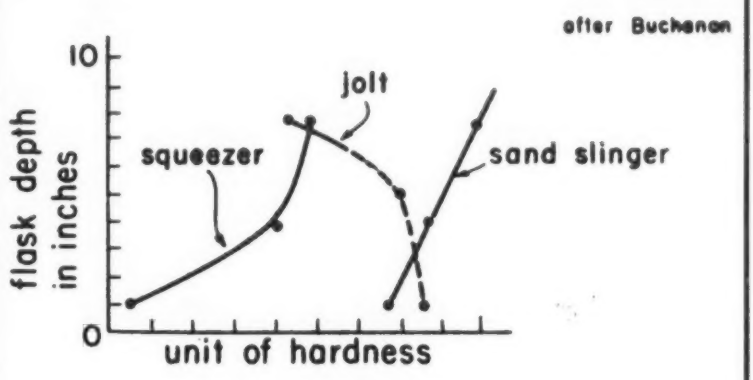
METHODS OF RAMMING

Characteristics	Diagram (hardness isofirms)
Hand ramming ■ variable hardness ■ laborious and slow ■ low first cost ■ human equations high	
Jolt ramming ■ mold lifted repeatedly and dropped ■ hard on equipment ■ uneven density ■ best for horizontal surfaces	
Squeezing ■ relatively small work only ■ best for shallow flasks	
Sand slinger ■ fast operation ■ high first cost ■ uniform ramming	

With squeezing, sand is compressed into the flask by a piston table arrangement which squeezes the sand between a platen and the pattern. The isofirm diagram shows the sand density greatest at the side from which the pressure is applied (the side away from pattern). Squeezing benefit is limited to rather shallow work unless coupled with jolting. This combination is often used advantageously, being more versatile in size of flask range and type of casting contours than either method of compaction would be independently.

The diaphragm directional squeeze molding machine is a more recent development. The squeeze is applied to sand by a diaphragm which actually deforms according to pattern contours. A sand area about 40 per cent greater than the flask area is squeezed with a force of compaction approximately four times that of an ordinary jolt-squeeze machine.

Of the three basic machine ramming methods, the sand slinger produces the most uniform mold hardness, particularly for larger work with deep flasks. The slinger also produces a mold with consistently in the flask. Thus the density is



These curves compare relative mold hardness with respect to flask depth that the three basic ramming methods produce. This comparison was obtained by ramming molds in identical 8-in. flasks. Molds were then sectioned and hardness was measured at different levels. For the squeezer, mold hardness is at a minimum at the mold surface and increases progressively on a slight curve to a maximum at the top of the flask.

Jolting produces an opposite picture. Although its minimum hardness is only slightly less than the squeezer's maximum, both values occur at the top of the mold.

Slinging produces a mold with uniform and consistently high hardness as demonstrated by its curve.

higher mold hardness than that produced by the other methods. In slinging, an impeller, operating at 1200 to 1800 rpm, throws sand into the flask at a velocity of approximately 10,000 ft per min. These high velocity sand particles are decelerated to zero velocity by the pattern and/or depositing sand. This impact of sand particles produces a ramming action. Sand slingers can handle from 1000 to 4000 lb of sand per minute. Although slinging is a very fast operation, the initial capital investment is high.

Blowing is a method of compacting sand which is not extensively used in molding. With proper venting, blowing produces a uniform mold hardness. Precision flask equipment and problems of properly venting reduce its adaptability for general use. Some foundries make sand molds with the German core shooter and blowing machines. Stack molds are especially suited to this technique.

Because of the characteristic mold produced by each of the three principal machine molding actions, generalized statements can be made regarding their application.

- **Squeezing.** Maximum performance obtained with rather shallow work.
- **Jolting.** Use for deeper flasks and to ram deep green sand pockets uniformly.
- **Slinging.** Has the flexibility of hand ramming plus uniform hardness in any depth flask.

Knowledge of these characteristics will guide the foundryman in determining which machine will produce the best mold from a given pattern.

step 2 . . MATCH MOLDING MACHINES TO YOUR JOBS

Correct application of machine to given job will produce a better and less expensive mold

The second step toward profitable use of molding machines is to recognize that the correct application of a molding machine to a given job will produce not only a better mold but a *less expensive mold.*

Variation in cost for the same mold produced on two different types of machines is demonstrated in Table 1. Five jobs are compared, using two different machines on each job. The last column, labelled "% Waste by Using Wrong Machine" is the difference in the two molding times divided by the smaller.

You may ask, "Aren't the most efficient machines in a jobbing shop overloaded?" This is often the case. If a machine is consistently "overloaded" one should consider new and better equipment to replace machines showing less profitable performance. However, with any so-called optimum molding machine layout, there are bound to be periods of overload or undesirable product mix requiring the use of a machine which is less efficient for the job.

Casting B serves as a good example of the result of over loading. The jolt, roll-over, draw machines are consistently scheduled to full capacity. Consequently Casting B is often produced on the jolt pinlift because the other jobs made on the jolt roll-over machine would

Table 1. Production Time Comparison for Different Types of Molding Machines

Type Machine	Make Drag	Make Cope	Place Core(s)	Close	Total	% Waste By Using Wrong Machines
■ Casting A—12" x 12" Flask, 5" Cope, 4" Drag						
Jolt Squeeze	—	—	—	—	5.1	51
Jolt with Air Ramming	2.60	4.56	0.58	0.92	7.7	
■ Casting B—30" x 30" Flask, 6" Cope, 6" Drag						
Jolt Pin-Lift	6.71	7.47	1.16	1.68	17.02	14
Jolt Roll-over Pattern Draw	3.94	6.19	1.16	3.70	14.99	
■ Casting C—12" x 18" Flask, 5" Cope, 5" Drag						
Jolt Squeeze	—	—	—	—	4.2	74
Jolt with Air Ramming	2.49	3.54	.29	.99	7.3	
■ Casting D—30" x 30" Flask, 12" Cope, 9" Drag						
Jolt Roll-over Pattern Draw	5.23	8.35	4.39	3.84	21.81	61
Jolt	11.64	15.46	4.41	3.60	35.11	
■ Casting E—48" x 48" Flask, 18" Cope, 16" Drag						
Jolt with Air Ramming	45.47	57.61	—	—	103.08	28
Floor Molding with Air Ramming plus Slinger	51.63	80.15	—	—	131.78	

NOTE: All times given in minutes.

show an even greater per cent of inefficiency on the jolt pin-lift.

At this point, you are probably interested in some typical molding times to compare various types of molding machines. Because of numerous variables it is impossible to compare values; instead some examples can be cited.

In a gray iron shop a small jolt squeeze machine is producing 150 molds per 8 hour day with hand shovelling of sand and setting molds aside on the floor; while a similar machine with automatic sand delivery and flask and mold conveyance system is producing 400 molds per day per one operator. In another iron shop a diaphragm molding machine is producing 300 complete molds in 36 in. x 48 in. flasks and is not operating at maximum capacity.

In a steel foundry using facing sand plus backing sand on jobbing work, a jolt squeeze pin-lift machine is producing 30 molds per hour.

In discussing time or cost analysis we recognize numerous other factors which must be considered but which could not be covered.

Figures used in Table 1 are based on standards for a molding machine layout at Lebanon Steel which was recently replaced. The reader is cautioned not to use the figures to compare different types of molding machines in general because the figures are dependent on plant layout and materials handling techniques as well as pattern complexity and mold materials.

These data were presented to show the possible economies resulting from proper machine scheduling of a job at Lebanon Steel Foundry. Similar savings are available to you, if your facts are gathered and analyzed objectively.

In addition to its sand ramming function, the molding machine may perform one or more allied operations. Some of these operations are clamping, roll-over, and pattern draw (usually found in that order on the same machine), pin-lift (which is actually mold draw), and strike-off.

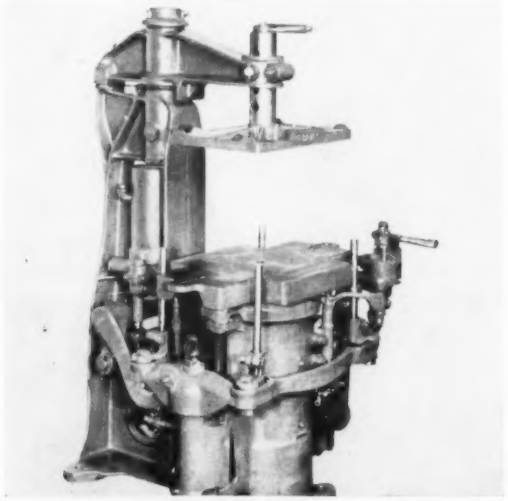
In addition to these direct machine functions, flask and mold handling facilities are being incorporated in many types of new machines to reduce the physical work required of the operator. Conveyors for rolling flasks to or from machines have found wide acceptance by foundries in recent years due to the rising cost of foundry labor. Along with this has come the development of mechanical methods for locating molding equipment on machine tables.

FOR SALE—MOLDING MACHINES

In the preparation of this paper, letters were sent to every molding machine manufacturer in the United States. We requested these manufacturers to contribute information on their equipment and the information from each manufacturer who responded was used to prepare this up-to-date status report on machine molding. The photographs on these pages represent most types of green sand molding machines now being sold.

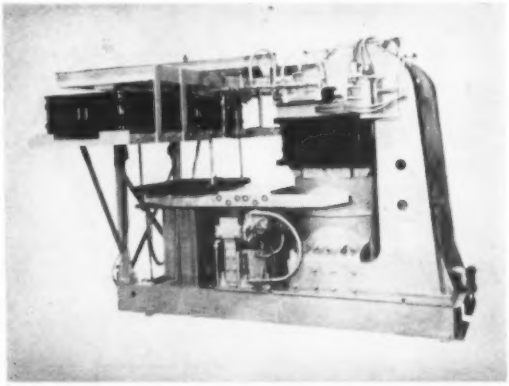
JOLT PIN-LIFT

Mounted on wheels, this machine is easily moved to any location in the foundry to handle small molding jobs. Made by Osborn Mfg. Co. For more information **circle No. 1, page 7-8.**



JOLT SQUEEZE PIN-LIFT

Faster operation is promised by unit that applies jolt simultaneous with squeeze. Machine has vibrating ram that causes sand to flow during squeezing. Recommended for reasonably shallow molds. Made by Osborn Mfg. Co. For more information, **circle No. 2, page 7-8.**



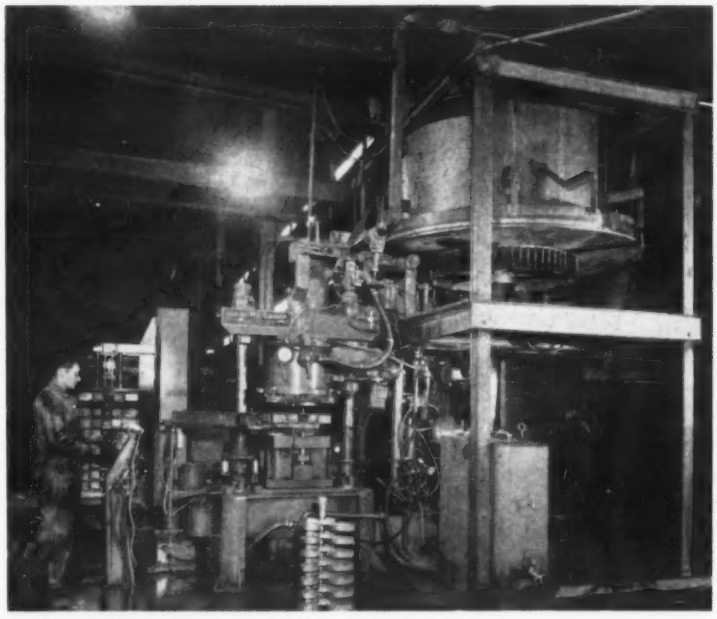
AUTOMATED JOLT SQUEEZE PIN-LIFT

Using two squeeze heads, machine can make cope and drag molds or two different patterns at the same time. Adjusts to various flask heights. Automatic, semi-automatic, or manual operation. Manufactured by Herman Pneumatic Machine Co. For more information, **circle No. 3, page 7-8.**

JOLT SQUEEZE PIN-LIFT

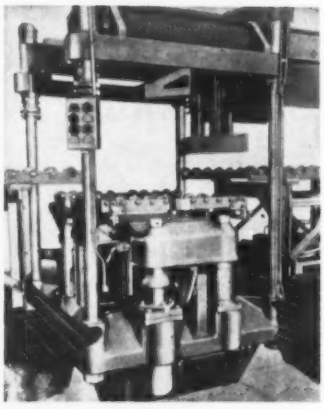
Simultaneous jolt squeeze for deep flasks and difficult molds. Molds copes and drags singly, or in combination. Features shockless jolt. Molding cycle is automatic. Built by Tabor Mfg. Co. For more information, **circle No. 4, page 7-8.**

FOR SALE—MOLDING MACHINES



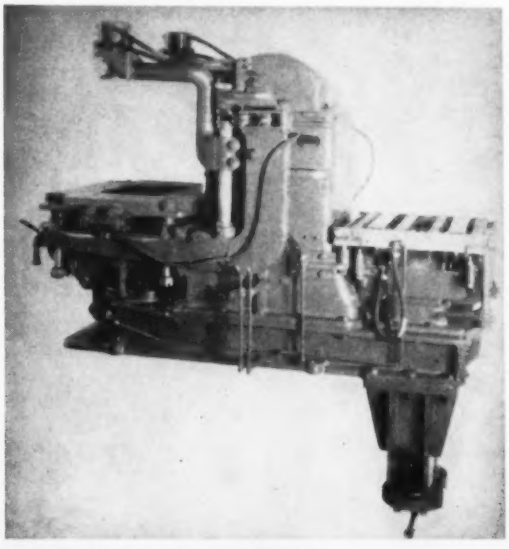
MOLD BLOWER

Mold blowing machine has low pressure sand prefill to eliminate pattern wear. Unit automatically prefills, blows, and squeezes mold. Built by Federal Foundry Supply Co. Div., Archer-Daniels-Midland Co. For more information, **circle No. 5, page 7-8.**



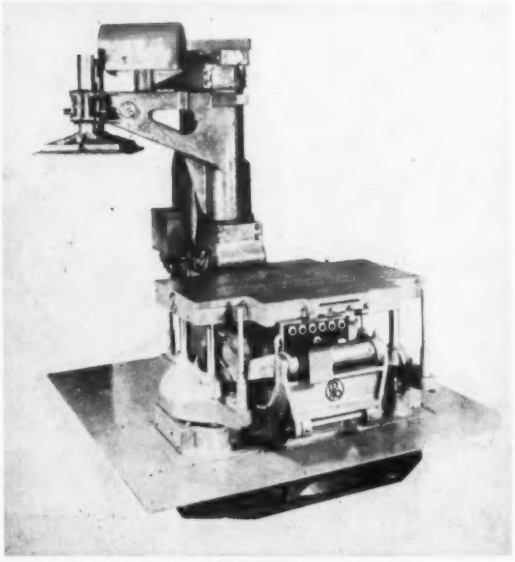
JOLT SQUEEZE

Heavy duty combination jolt-squeeze with pneumatic pattern draw. Equipped with air operated car-type squeeze head and built-in adjustable flask roll-in and roll-out device. Supplied with controls for full automatic operation. Machine is shown in normal position ready to jolt. Built by Wm. H. Nicholls Co., Inc. For more information, **circle No. 6, page 7-8.**



JOLT ROLL-OVER DRAW

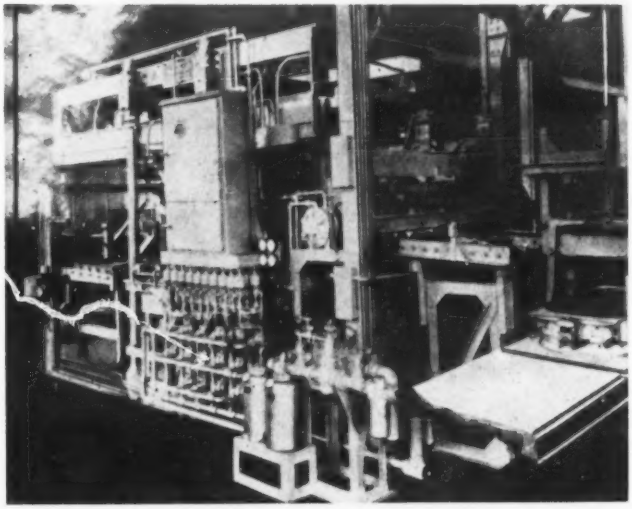
A large machine for heavy duty work which cannot be rolled over by hand. Built by Osborn Mfg. Co. For more information **circle No. 7, page 7-8.**



JOLT SQUEEZE PIN-LIFT

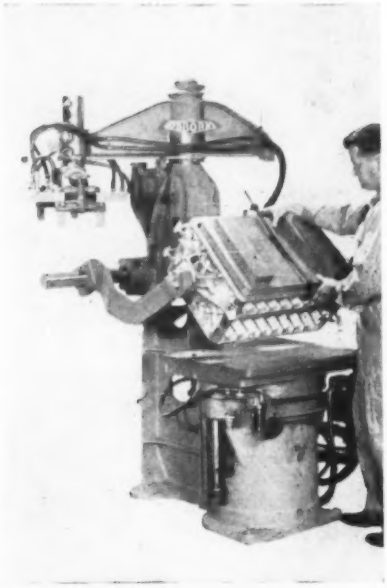
Large, semiautomatic unit has 2500-lb jolt and 28,000-lb squeeze capacities. Pattern draw is 12 in. Built by SPO Inc. For more information, **circle No. 8, page 7-8.**

FOR SALE—MOLDING MACHINES



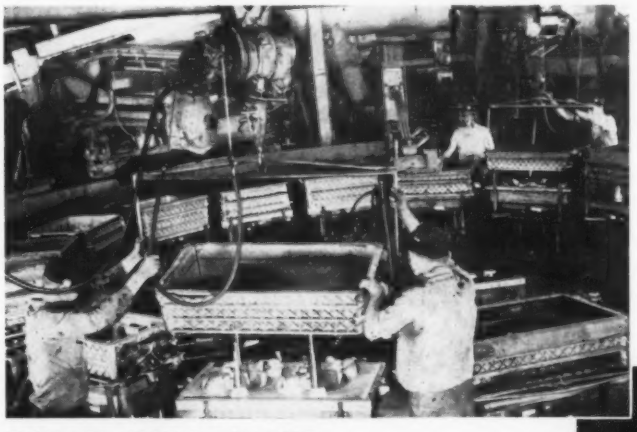
AUTOMATIC DRAG MOLDING UNIT

Jolt squeeze combination has pneumatic pattern draw. Equipped with air operated car-type squeeze head and built-in flask roll-in, mold roll-out device. Also has measuring sand hopper, flask index, sand spill upset, flask feed-in elevator, mold turnover, and mold transfer. Wm. H. Nicholls Co., Inc. For more information, **circle No. 9, page 7-8.**



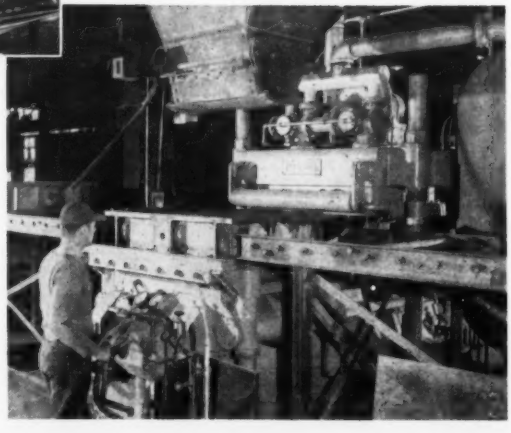
JOLT SQUEEZE ROLL-OVER DRAW CLOSE MACHINE

Manual effort in match plate molding is eliminated by mechanizing five basic operations with this machine. Cope is drawn and handled mechanically. Economically mechanizes short run work. Built by Osborn Mfg. Co. For more information, **circle No. 10, page 7-8.**



SLINGER WITH PIN-LIFT AND AUTOMATIC STRIKE-OFF

Remote control slinger used with mold turntable, pin lift, and automatic strike-off. All built by Beardsley & Piper Div., Pettibone Mulliken Corp. For more information, **circle No. 11, page 7-8.**



DIAPHRAGM MOLDING MACHINE

Roll-on, roll-off unit permits molding on the conveyor and other variations. Diaphragm is stationary while the traverse car moves under the head like a drawer. Eastern Clay Products Dept., International Minerals & Chemicals Corp. For more information, **circle No. 12, page 7-8.**

step 3 . . INTEGRATE MACHINES and FOUNDRY LAYOUT

The final step toward profitable use of molding machines is to incorporate the machines into an economical plant layout. The most efficient layout of any given plant will vary with its type of production, number and types of molding machines, materials handling techniques, and plant space.

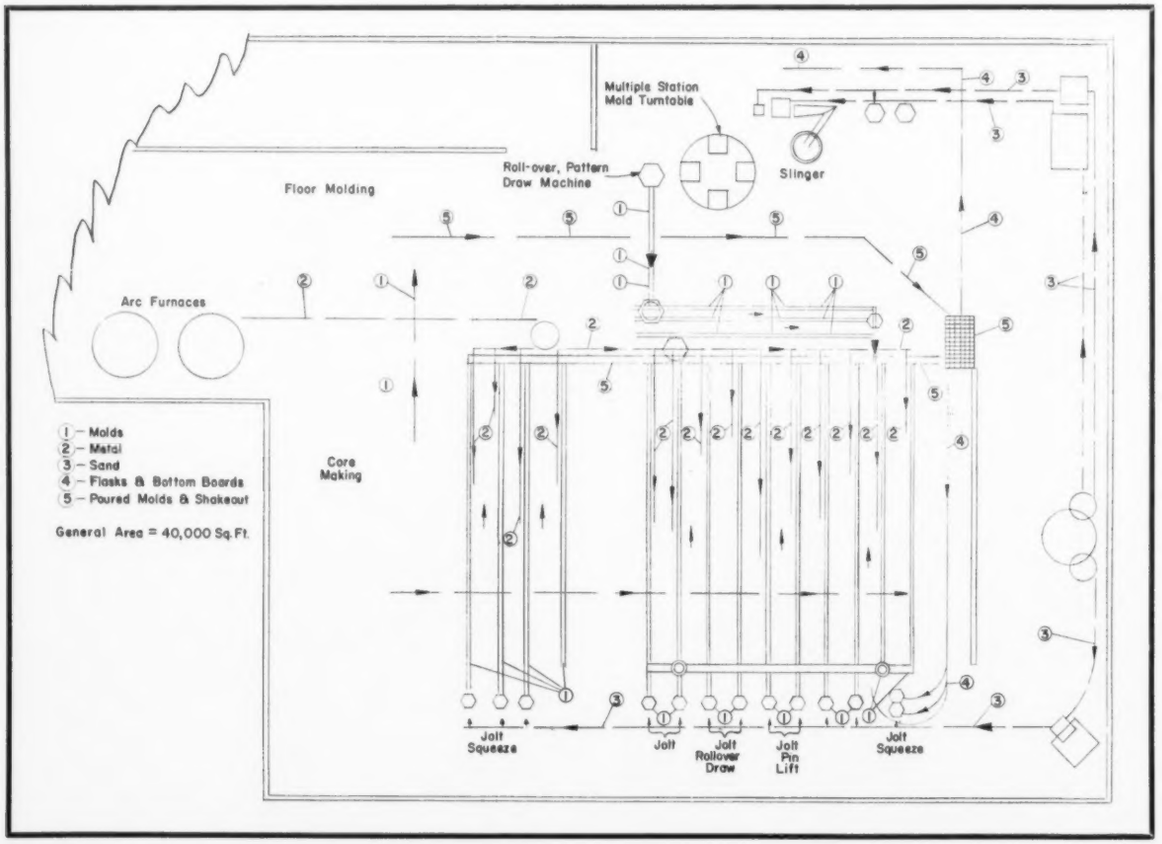
Principles of plant layout cannot be detailed here, but the authors would like to present the layout of a molding shop they organized at Lebanon Steel Foundry.

The drawing shows the general flow pattern but more specifically the variety of machines and versatility built into the layout. Note the bank of machines at the bottom of the layout. Jolt squeeze machines at the right have flask draw and flask and mold handling devices.

This is what you might call a semiproduction unit in a jobbing shop. At the top you will see a slinger coupled with a multiple station mold turntable roll-over-pattern draw machine. *All materials handling is semiautomated or motorized by pneumatic tube, roller conveyors, car type conveyors, transfer cars or travelling overhead cranes.*

The demands for higher quality and lower cost from customers, plus the pressures of wage demands, the growing scarcity of skilled molders, and the limits of factory space were all factors necessitating this type of modernization of machine molding at Lebanon Steel.

Many foundries have ceased operating and many more are showing a poor profit picture or are operating at a loss with blind hopes of a better tomorrow. Much of this business failure or loss of products is unnecessary. Better machine molding practice is not the complete answer to the problem, but should be one of the first strides toward improvement of the over-all foundry picture.



Economy of operation is the result of incorporating the most useful machines into the most efficient plant layout.

5 MINUTE WET ANALYSIS SPEEDS STEELMAKING

KARL JACOBSEN / *Chief Chemist*
Griffin Wheel Co., Chicago

2 Three one-gram samples ar weighed on an automatic balance

5 Sulphur test takes 3 minutes Sample is burned and SO_2 collect ed. Measurement uses automatic titration with iodate solution. Photo electric circuit keeps color constant

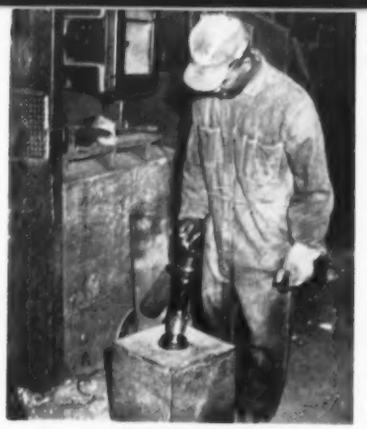
Advanced laboratory techniques are achieving spectacular savings at Griffin Wheel Co., Chicago plant. We can now analyze the content of electric furnace steel in less than five minutes through the use of modern laboratory apparatus.

This express service enables our company, one of the country's largest railroad equipment manufacturers, to adjust the steel mix as necessary before pouring in foundry. Thus we save a substantial sum and cut scrap losses to a minimum.

Since the control laboratory is 1500 feet away from the foundry which houses the electric furnaces, steel samples are expressed to the laboratory via pneumatic tubes. The carbon, sulphur, and manganese contents are analyzed immediately and simultaneously on automatic equipment and the report is tubed back to the foundry.

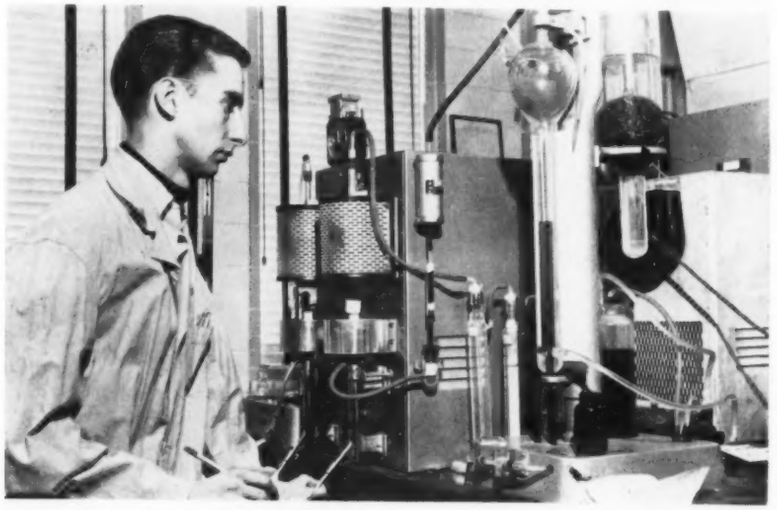
Then if the furnace mix varies slightly from the desired formula, any of the necessary elements can be added.

The step-by-step procedure is shown and described as follows:



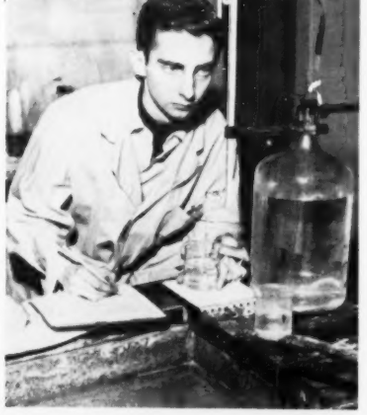
1 Analysis starts when steel sample from furnace is pulverized.

3 Mn determination starts with heating sample in oxidizing agent.



4 Carbon content is determined within 90 seconds by quickly heating one-gram sample to 3300 F in induction furnace. Carbon is burned to CO_2 and volumetric test indicates carbon content. Scale shows test results.

6 Permanganate solution (3) is now cooled to room temperature.



7 Manganese is determined by titrating permanganate solution.

8 Results are returned to shop by pneumatic tube. Speed of test allows adjustment in composition of metal before tapping, helping to cut scrap losses to a minimum.

Grinding wheels, properly u
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This simply means do not
wheels or play roll the hoop.
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with an eccentric wheel or go
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dust is under the grinding w

Do not throw the wheels a
the room to a fellow worke
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them separated and avoid bun
them.

Fig. 3 shows proper rackin
storage spaces. Cut-off wheel
stacked on their sides to pr
warpage.

Large dish wheels and thei
cylinders are racked on their
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Investigation of many dan
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cranes; and of a crane load o
ings dropped on the wheels.

Fig. 1 . . Wheel was dropp

GRINDING WHEELS are SAFE USE —DON'T ABUSE

You obtain faster, safer production by following manufacturers' recommendations

G. Frank Loewy /
Sales Representative
General Grinding Wheel Corp.
Philadelphia

Grinding wheels, properly used, are time and money savers when it comes to removing unwanted metal from castings. Improperly used, grinding wheels can become deadly high-speed missiles or tools for removing valuable fingers from operators. By following the Do's and Don't's emphasized in this article you can make your grinding operations both safe for the operator and profitable for the company.

■ DO always handle and store wheels in a careful manner

This simply means do not drop wheels or play roll the hoop. (Fig. 1 and 2.) Do not use a wheelbarrow with an eccentric wheel or go over a rough floor unless a bag of sawdust is under the grinding wheel.

Do not throw the wheels across the room to a fellow worker. In carrying or moving wheels, keep them separated and avoid bumping them.

Fig. 3 shows proper racking and storage spaces. Cut-off wheels are stacked on their sides to prevent warpage.

Large dish wheels and their soft cylinders are racked on their sides to prevent warpage. Large dish wheels and soft cylinders are racked on their sides to prevent chipping or nicking of the face of the wheels.

Investigation of many damages and breakages caused by such foolish practices as illustrated in Fig. 2. I know of steel mills and foundries where 24-in. wheels were rolled to the machines; of cases where they were dropped from overhead cranes; and of a crane load of castings dropped on the wheels.

■ DON'T use a wheel that has been dropped

If the transportation company or a man in the plant drops a wheel, return it to the manufacturer for testing.

The only cost is freight and much trouble can be avoided.

■ DO visually inspect all wheels before mounting for possible damage in transit

We recently had a 24x3x12-in. wheel returned because there was a crack in the hole that looked as if someone had scratched it. Further examination showed that someone had dropped or bumped the wheel and damaged it beyond repair. (Congratulations are due the operator for his keen observation that prevented a tragedy.)

■ DON'T force a wheel onto the spindle of grinder or alter the size of the mounting hole

Violation of this rule has caused many gray hairs for the grinding wheel man. If the wheel won't fit, get one that will. Instead of forcing a wheel on a spindle use an air gun to clean the threads and if that fails run a tap through the threads.

I had a call from a foundry that was breaking 2x¾x⅜-in. 24-thread wheels and hospitalizing personnel at a rapid rate. After a three-day investigation, sawdust was found in the threads. Instead of running a tap through wheels or blowing out the sawdust with an air gun, the wheels were being threaded on the spindles with the aid of a vise or a monkey-wrench. Such violent treatment cracked the wheels (See Fig. 4 and 5.)

This probem has been remedied by covering the threads with tape. On cone wheels with threaded bushings, allow one-quarter inch of air space between the end of spindle and bottom of threads. Less clearance causes bottoming that pulls out the bushing.

On wheels with unthreaded holes do not try to enlarge hole by drilling unless you have means of truing the wheel. Do not force a wheel on a shaft not meant for it. Bushings to reduce the hole size or enlarge spindle can be used only if they fit snugly.

■ DO check mounting flanges for equal and correct diameter

Mounting flanges should be at least one-third the diameter of the grinding wheel and should be relieved around the hole.

■ DON'T use flange if the bearing surfaces are not clean and flat

Flat washers should never be used as flanges. Flat washers exert too much pressure against sides of

Fig. 1 . . Wheel was dropped.

Fig. 2 . . Don't roll wheels.

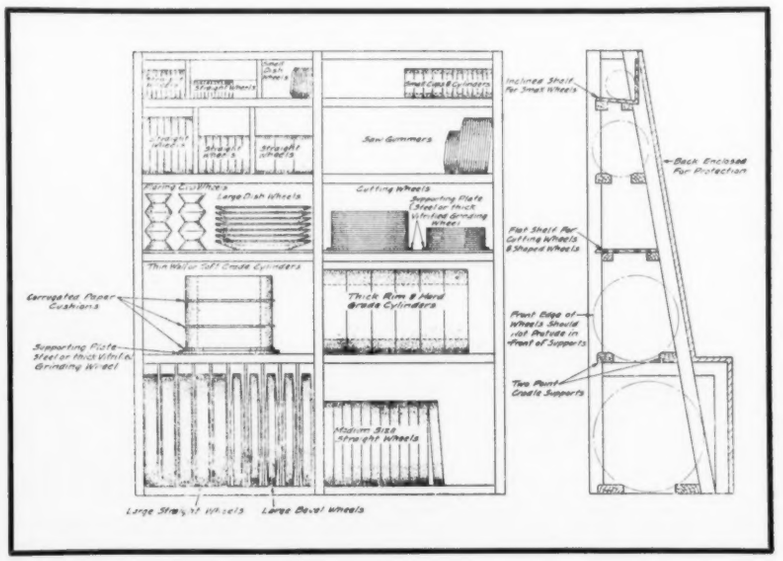


Fig. 3 . . Recommended procedure for storing grinding wheels.

the wheel, creating a heat condition that can crack it. Unequal diameter flanges set up pressures which are also capable of breaking wheels. (Fig. 6, 7, 8, and 9.)

■ DO use mounting blotters supplied with wheels

Wheels today are smoother than formerly. However, the surfaces are not perfect. Blotters help cover the unevenness and also relieve the strain of flanges on sides of wheel.

■ DON'T tighten the mounting nut excessively

In Fig. 7 a flange has been tightened excessively, giving the opposite effect for which the mount was intended. This wheel is weaker than the ones in Fig. 8 and 9. Excessive tightening of the outer flange does not give a full grip on the side of the wheel, causing the same effect as flanges of unequal diameter.

Wheels mounted this way break readily because uneven strains develop in them.

■ DO be sure work rest is properly adjusted

On all stand grinders, work rest should be at center of wheel or above. Be sure the rest just clears the wheel—no more than ⅛-in. away from wheel. If the opening is too great, the object being ground can jam into the wheel, which will cause breakage, serious damage, and injury.

I would like to illustrate this principle with one of my service call experiences. A 20-in. safety tapered vitrified wheel is difficult to break. However in this situation the wheel was easily broken by an operator who decided his work rest was too close to the wheel and was creating far too much dust.

Consequently he moved the work rest back, leaving a ⅜-in. clearance. Sharp cornered castings were being ground.

One of them jammed between the rest and wheel, breaking the wheel. Had the wheel not been safety-tapered, the man would have been killed. Instead of his life he lost one and one-half fingers.

■ DO always use a guard covering at least one-half of the grinding wheel

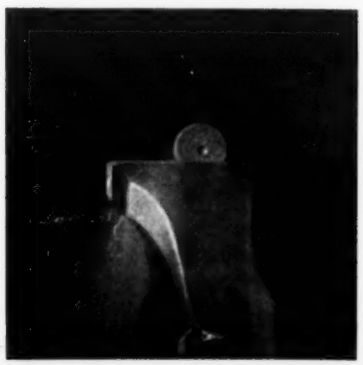
The 1956 Safety Code of The American Standards has revised this principle, recommending that at *least one-third to one-half of the wheel be covered.* This guard protects the operator. Should breakage occur, the pieces will propel downward with a minimum of damage.

■ DON'T start the machine until the wheel guard is in place

In case the wheel was mishandled and breaks immediately, the guard will minimize the damage.

■ DO check maximum operating speed established for the wheel against machine speed

All wheels are marked with the recommended safe operating speed. Possible exceptions may be small wheels, 1½-in. diameter or less, because they are somewhat difficult to mark. However, they will be marked on request or tags will be sent with them.



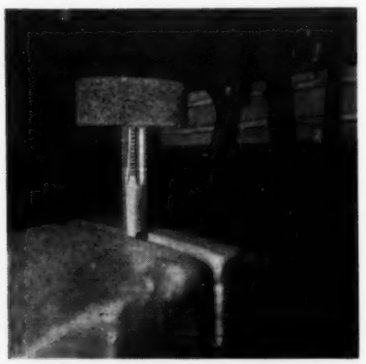


Fig. 4, 5 . . Don't vise-grip grinding wheels—hold tap instead.

Fig. 6, 7 . . Flanges on left are unequal; on right, too tight.

Fig. 8, 9 . . Correct mounting: diameters even, properly tightened.

■ DON'T ever exceed maximum operating speed established for the wheel

If the wheel is marked 6000 rpm, do not run at 9000 rpm. This happens entirely too often. For example, we recently received an order for two 14-in. vitrified wheels. Upon checking a previous order from this foundry we discovered that 12-in. wheels were the largest that could be safely used on this equipment.

Unfortunately the foundry had changed hands since the last order and the new owners, desiring to economize, calculated that a 14-in. wheel at a slightly higher price was a better buy. I telephoned the customer and explained that a wheel larger than 12 in. was unsafe. The customer agreed to take 12-in. wheels when the safety factor was stressed.

When mounting new wheels on step-pulley machines, always shift the belt to slow speed.

Otherwise a whistling-hissing sound may be heard as a piece of wheel flies across the room. Periodically check the air grinder speeds.

Their governors will often become defective so that speed control of the machine is lost. If your grinder sounds like a jet plane taking off, remove it from service immediately. It may be running as much as three times normal speed.

Remember resin-bonded wheels revolve safely at a maximum of 9500 surface ft per min (about 90 miles per hour). Vitrified wheels should rotate no faster than 6000 surface ft per min (60 miles per hour). Running a wheel marked 4500 rpm at 10,000 rpm is about as safe as driving a car through a city street at 95 miles per hour.

■ DON'T stand directly in front of a grinding wheel whenever a grinder is started

This constitutes a safe practice in case the wheels were mishandled prior to mounting or during previous use. As one starts the ma-

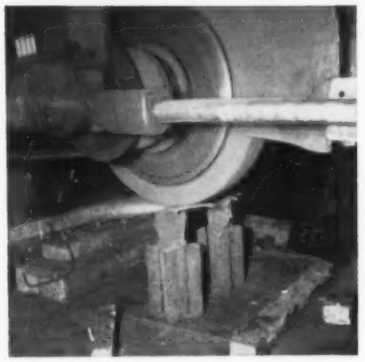


Fig. 10, 11, 12 . . Jamming of work into wheel (left) instead of correct procedure (center) ruins wheel.

(All photographs courtesy of the Baltimore Foundry & Machine Co., Baltimore, Md.)

chine, it is mandatory to stand to one side for at least one minute.

■ DO allow newly mounted wheels to run at operating speed with guard in place for at least one minute before grinding

This practice provides a safeguard against any previous mishandling.

If the wheel has been properly treated, nothing happens. A mistreated wheel will usually break during this minute.

■ DO always wear safety glasses or some type of eye protection when grinding

Wheels throw off hot sparks and chunks of abrasive and metal. Although a spark may only be painful, a chunk of wheel or metal can have a very devastating effect on the eye.

The use of eye protection by grinder operators is imperative Goggles or eye shields may be shattered, but the eyes will be carefully protected.

■ DON'T grind on the side of the wheel unless wheel is specifically designed for that purpose

Side grinding usually causes a segmental break.

The Grinding Wheel Institute is currently conducting a research project on the effects of improper side grinding.

■ DON'T jam work into the wheel

Figures 10, 11, and 12 show a wheel jammed on a spike. Had the spike been bent over, the wheel would have given excellent service. A pointed illustration can be provided by an operator who, in attempting to make a spatula, broke two wheels on a special mount simultaneously and injured himself.

■ DO turn off coolant before stopping wheel to avoid creating an out-of-balance condition

If the wheel is allowed to remain in the coolant, it can be thrown out of balance as much as a pound. Such a condition leads to wheel breakage.

■ DON'T grind material for which the wheel is not designed

Wood and rubber, if ground on a regular wheel, will fill the pores. If steel or other metals are ground later, the wheel heats and breaks.

Sheer physical self-preservation requires that you carefully follow these safety rules to the letter.

■ Our industry produces safe grinding wheels. It is up to you to keep them safe. Use them but don't abuse them.

■ Tear sheets of this article may be obtained by writing MODERN CASTINGS.

for safety in grinding operations . .

Do	but	Don't
1. DO always HANDLE AND STORE wheels in a CAREFUL manner.		1. DON'T use a wheel that HAS BEEN DROPPED.
2. DO VISUALLY INSPECT all wheels before mounting for possible damage in transit.		2. DON'T FORCE a wheel onto the machine OR ALTER the size of the mounting hole—if wheel won't fit the machine, get one that will.
3. DO CHECK MAXIMUM OPERATING SPEED established for wheel against machine speed.		3. DON'T ever EXCEED MAXIMUM OPERATING SPEED established for the wheel.
4. DO CHECK MOUNTING FLANGES for equal and correct diameter. (Should be at least ⅓ diameter of the wheel and relieved around hole.)		4. DON'T use mounting flanges on which the bearing surfaces ARE NOT CLEAN AND FLAT.
5. DO USE MOUNTING BLOTTERS supplied with wheels.		5. DON'T TIGHTEN the mounting nut EXCESSIVELY.
6. DO be sure WORK REST is properly adjusted. (Center of wheel or above; no more than ⅛-in. away from wheel.)		6. DON'T grind on the SIDE OF THE WHEEL unless wheel is specifically designed for that purpose.
7. DO always USE A GUARD covering at least one-half of the grinding wheel.		7. DON'T start the machine until the WHEEL GUARD IS IN PLACE.
8. DO allow NEWLY MOUNTED WHEELS to run at operating speed with guard in place, for at least one minute before grinding.		8. DON'T JAM work into the wheel.
9. DO always WEAR SAFETY GLASSES or some type of eye protection when grinding.		9. DON'T STAND DIRECTLY IN FRONT of a grinding wheel when a grinder is started.
10. DO TURN OFF COOLANT before stopping wheel to avoid creating an out-of-balance condition.		10. DON'T grind material for which the WHEEL IS NOT DESIGNED.

T&RI ANNOUNCES . . .

NEW TRAINING SUPERVISOR
NEW TRAINING COURSES

Ralph E. Betterley is now serving as the Training Supervisor of the AFS Training & Research Institute. Formerly assistant professor of industrial engineering, Technical Institute, Northwestern University, Mr. Betterley obtained his Bachelor's Degree in 1935 and his Master's Degree in Industrial Education in 1947 from the Stout Institute, Menominee, Wis. His professional experience includes over 20 years teaching foundry practice, woodworking, welding, metallurgy, forging, machine shop practices, and industrial engineering.

Trustees of the T & RI have announced the following six new training courses to be added to the 1958 curriculum:

- Non-Destructive Testing
- Melting Copper-Base Alloys
- Metallography of Cast Metals
- Patternmaking
- Industrial Environment
- Air Pollution Control and Legislation

Dates and locations for these courses will be announced soon.

Meanwhile current 1957 courses continue to be oversold. Pictures on this page show several of the classes in session. Twenty-eight men attended the first course in Foundry Cost Reduction Through Better Methods and Performance Standards held at Marquette University, Milwaukee. Under the able supervision of Dr. M. E. Mundel, international authority in this field, the men participated in work sessions which involved study of motion pictures of foundry operations. Jobs were studied and rated on work sheets.

Registrants for this course were principally industrial engineers, time study engineers, and cost analysis specialists. Dr. Mundell was assisted by J. Westover, Westover Foundry Engineers, and two industrial engineers of John Deere Co.: R. A. Gongwer and R. E. Trunnell, Jr.

Course evaluation questionnaires have been sent to all men attending courses. Answers to the questions have been most gratifying. In reply to the question—"In your opinion, was the time and money spent in attending this course worthwhile to you and your company?"—the answers were 100 per cent emphatically "yes".

AFS Institute Courses

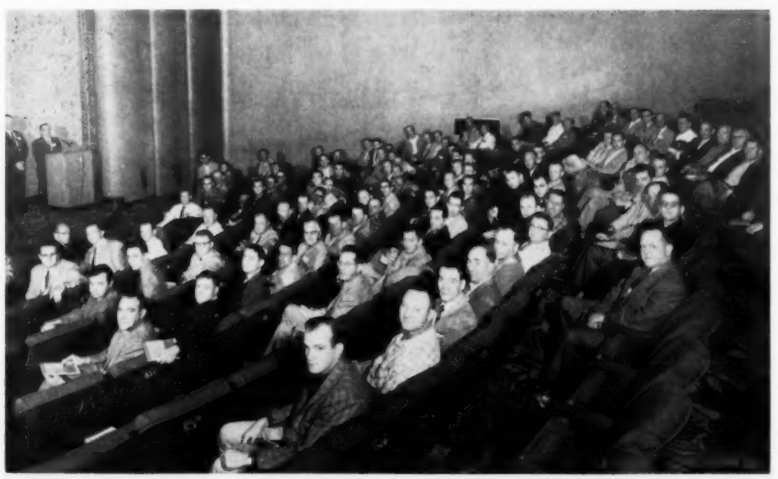
No. 4-A . . Advanced Sand Technology
November 4-8, 1957

No. 5-A . . Cupola Melting of Iron
December 2-6, 1957

No. 5-B . . Cupola Melting of Iron
January 27-31, 1958

T & RI Director S. C. Massari welcomes the Training Supervisor, Ralph E. Betterley, at the AFS Headquarters.

Learning the ABC's of Foundry Cost Reduction at Marquette University, during week of Sept. 23.



Over 100 men in Detroit for course—Sand Control for Shop Operations.

Foundrymen attending the third Sand Testing course enjoy a banquet.

Fig. 1 . . Quick-locking clamp hooks sheet metal hood into position on the crucible carriage.

ROBERT LANGSENKAMP / *President*
Langsenkamp-Wheeler Brass Works, Inc.
Indianapolis

PORTABLE COLLECTOR TRAPS BRASS FUMES AT SOURCE

Versatile hood at pouring station solves in-plant air pollution problems for Indiana plant

Have you ever worked in a brass foundry where zinc oxide fumes were so dense you couldn't distinguish your fellow workers twenty feet away? Did you become nauseated, break out in a sweat, and shiver as the result of working in such an atmosphere? *If so, then you've had the "zinc shakes" and can genuinely appreciate a fume collector that actually catches zinc fumes at the point of origin so they never enter the foundry working environment.*

At Langsenkamp-Wheeler Brass Works, Inc. in Indianapolis we have found that installation of this new concept of dust and fume collection has solved a problem that has been a constant plague on nonferrous foundry operations. The equipment that turns this trick is simply:

1) metal hood positioned over pouring ladle and anchored to holding carriage;
2) flexible tube leading from hood to overhead duct;
3) centrifugal blower that draws 2500 cfm of air into system through hood and exhausts it out of stack.

Before New Installation

Before solving our foundry atmosphere problem we had taken the conventional approach of installing several large fans in the foundry roof. These fans were capable of exhausting 200,000 cfm of air from the foundry. But still zinc fumes hung over the pouring floor like a colloidal suspension in the air and zinc oxide fell on the men like snow. Often by midafternoon, workers were weak or incapacitated by this lethal smog.

During winter, exhausting this large volume of heated air represented expensive Btu's pouring out

of the plant. An equal quantity of below-freezing drafts leaked in through every opening available in the foundry building. Discomfort of the men in pouring areas became a combination of *hot metal, cold drafts, and zinc chills.*

After Installation

Although we haven't eliminated the hot metal, drafts and chills disappeared with installation of our new mobile fume collector. Even after pouring 5000 lb of superheated 85-5-5-5 the atmosphere in the pouring area is as clear as the foundry superintendent's office. And with only 2500 cfm of air being removed you can't notice air movement three feet from the exhaust hood over the pouring crucible. Improved foundry environment also gave a boost to worker morale and decreased turnover.

How It Works

Here are some pertinent details on how and why this equipment can do its job so well. In Fig. 1 you see a crucible of molten brass which has been brought into the pouring area by overhead monorail from the melting room on the right. A sheet metal hood is being attached to the crucible carriage with a quick-locking clamp. This hood, positioned about 6 inches above crucible, is a stainless steel semicircle with 14-in. diameter.

A 6-in. diameter flexible tube is the link between the stainless steel hood and an overhead collector duct mounted on top of the monorail. This tube is wire-bound, neoprene-coated fabric. It is so flexible that the ladle can be rotated 360° and the tube will wrap itself around the vertical ladle support with no difficulty.

The upper end of this flexible tube connects to the "mobile transition box." This box is on wheels so that it can roll back and forth in a direction parallel to the bridge crane monorail.

You will note that we set our molds in rows with aisles running in same direction as this overhead monorail. This arrangement lets pour-off men move back and forth in one aisle pouring molds on both sides. After molds adjacent to one aisle are poured, bridge crane is moved down the shop until overhead rail is centered above the next aisle.

Fig. 2 . . Hood and crucible become intergal unit.

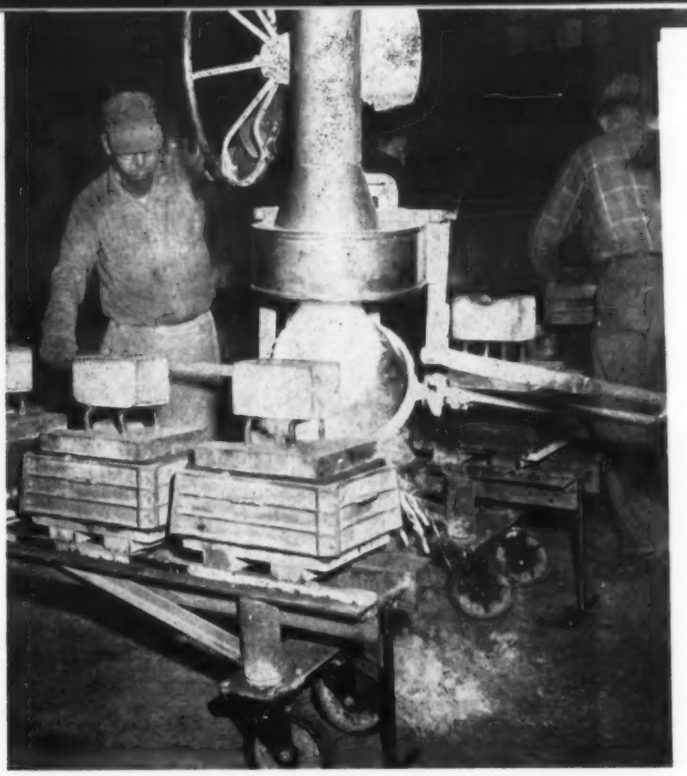


Fig. 3 . . Absence of fumes indicates effectiveness of system.

The transition box has a unique design that allows it to move back and forth, yet maintain a closed circuit in the duct system. This neat trick is possible because the collector duct on which the box is rolling has only three metal sides. The top side is a canvas belt fitting snugly in a groove on each side. The canvas belt is threaded through a set of rollers within transition box in such a way as to create an opening into collector duct.

A similar transition box is used as the connecting link between the collector duct and the main duct running down the shop next to the wall. This main 9 x 11 in. duct, 118 ft long, extends the entire length of pouring floor.

Near each end of the main duct, a 3-hp paddle-type blower is installed. Figure 4 shows one of these blowers which draws air from the duct and blows it into a 9-in. round exhaust pipe leading to a brick exhaust stack 60-ft high.

Our installation has sufficient capacity to add another bridge crane with a fume collector so that two ladles of metal can then be handled simultaneously in the pour-off area.

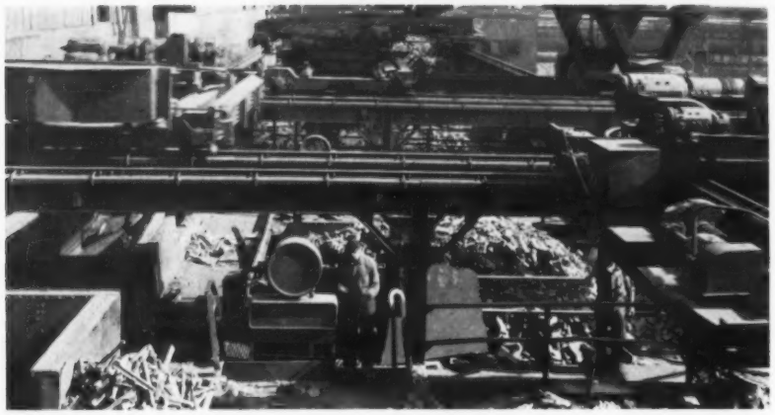
Results:

Figures 2 and 3 are photos taken during pouring. White zinc oxide fume can be seen flowing up into the hood with no evidence of any escaping around the edges into the foundry atmosphere. *The fume is being caught in its most toxic condition — at the moment it forms and leaves the surface of melt.*

After operating this system for a year we are convinced that trapping fumes at their source has solved our in-plant air-pollution problem.

■ Tear sheets of this article may be obtained by writing Modern Castings.

Fig. 4 . . Paddle-type blowers are located at each end of main duct.



See new handling methods when . .

AFS FOUNDRY SHOW FEATURES MATERIALS HANDLING EQUIPMENT

Recognition of the castings industry's need to adopt mechanized and automated production methods is expected to make the 62d AFS Foundry Equipment Show the largest in its history.

Manufacturers with new equipment, processes, and materials to meet the requirements of a castings industry awakened to the demands of competition are now preparing exhibits to fill the 124,000 sq ft Cleveland Public Auditorium May 19-23. On the first day of space assignment, Oct. 1, the AFS Exhibits Department reported that 53 per cent of the total space available was already under application to 115 exhibiting firms.

Exhibit Manager William N. Davis stated that, "The early and unprecedented demand for exhibit space indicates that manufacturers and suppliers have a greater-than-average number of new products and increased interest in U. S. market.

Three trends indicated by early requests for larger exhibit spaces are that foundries are buying more materials handling equipment, that the development of equipment for quality control continues at a rapid pace, and that foreign foundry equipment and supply firms have increased interest in U.S. markets.

Materials handling equipment builders whose applications were on hand when space assignments began included four manufacturers of fork lift or tractor shovel trucks. Producers of conveyors, monorail and tramrail equipment, and automatic transfer machines have also been assigned to exhibit spaces.

Non-destructive testing equipment on display for use in foundry quality control programs will include stress-analysis machines, portable hardness testers, radiographic inspection equipment, and a complex installation using radioactive isotopes for sand control.

A foreign builder of foundry equipment plans to have one of the largest operating exhibits in the show and other overseas firms will have displays of both equipment and processes developed abroad.

The total area available for exhibits at the 1958 show is 25 per cent greater than that available for the 1954 show in the Cleveland Public Auditorium. The increased space results from the addition of the Auditorium's arena and its stage to the exhibit area. Exhibit Manager Davis reports that a large part of the arena floor space has already been assigned to an exhibitor who plans an operating display of welding equipment to clean and repair castings.

AFS President's Report

H. W. DIETERT REVIEWS PROGRESS OF EUROPEAN FOUNDRIES

These are my impressions as I traveled through various countries after attending the International Foundry Congress at Stockholm, Sweden. This trip gave me the opportunity of exchanging ideas with many foreign foundrymen.

All European countries seem to be aware that prosperity hinges on their ability to export more than they import. This requires a large trading area.

The Common Market Group, consisting of six European countries: Italy, Germany, France, Luxemburg, Belgium and Denmark, seem to be making progress towards the establishment of a large tariff-free trading area.

Trading Areas

A second group of European nations are now beginning to receive attention. These countries are Great Britain, Sweden, and Switzerland who speak of their endeavor as a Free Trade Area Group. Their feeling is that the Common Market Group will be eventually not only an economic grouping but a political grouping as well.

Thus, there are two trading area groups in formation that will affect American firms selling goods to Europe. It may mean that American firms may find it advantageous to manufacture more items in European nations.

The foundrymen of England are in a very progressive mood with excellent projects underway. Cities such as London, Birmingham and Middlebrough, are growing cities with industry expanding. In contrast, the city of Glasgow is actually decreasing in population due to migration of excellent college-trained men and skilled workers to other parts of the world.

Due to shortages of production facilities, Norway is importing steel castings, particularly castings used under high stress. A buyer there stressed the desire for insurance of casting quality.

Swedish firms are still stressing quality and their high export volume results from maintenance of quality and not necessarily from a price advantage.

A quick view of Finland shows how determination can produce a very enjoyable way of life in a nation without natural resources such as good farming land, coal or minerals. The main exports still are from the pine forest and nickel mines; with Russia holding the greater and better share of the nickel deposits. A very democratic way of life is practiced among these very pleasant people. Helsinki is an enjoyable, modern city.

The industry of Western Germany is in high gear. One is justified in saying that they obtain a high production of above average quality from their workers. Prices and agressive salesmanship undoubtedly account for much of their success. Here is a country where, before World War II, women were housekeepers and family-bearers. The German housewife is the mainstay behind the rapidly increasing sales of home appliances.

Labor Shortage

One may hold the opinion that only in North America is there a shortage of workers, but this is not the case. A good example of the world-wide shortage of skilled workmen can be found in Switzerland where the expansion of industry is seriously hampered by a shortage of workmen.

The AFS Training and Research Institute has been established to prevent this situation from developing here. We, in North America, must train our own workmen in certain specialized operations and up-grade workmen found in our own organizations.

The workers in our plants must be considered as one of our greatest assets. Our best investment can be in our skilled workmen. Training and up-grading our own plant employees is the key to high quality castings produced at going rates.

new books

Second Report on the Shell Moulding Process . . J. L. Rice. 22 pp. Association of Brass and Bronze Founders, 69, Harborne Rd., Edgbaston, Birmingham 15, England, 1956.

This supplements the "Interim Report on the Shell Moulding Process," issued in 1954. While new developments have been steady rather than spectacular, the sponsors feel that sufficient material is available to make the new report of value. Like the initial survey, work was carried out by the British Non-Ferrous Metals Research Assn. by arrangement with the Assn. of Bronze and Brass Founders.

Design of Gray Iron Castings . . Arthur Scharf and Charles F. Walton. 46 pp. Gray Iron Founders' Society, National City-East 6th Bldg. Cleveland 14, 1956.

A presentation of casting from the design engineer's viewpoint, this publication covers functional strength, performance, appearance and economy. Includes a brief bibliography.

Elements of Engineering Materials . . Charles P. Bacha, Joseph L. Schwalje, and Anthony J. Del Mastro. 494 pp. Harper & Bros., 49 East 33d St., New York 16, 1957.

As an introductory text on the elements and applications of engineering materials, this book is designed for students in most branches of engineering. All engineering materials including wood, cements, plastics, rubber, soils, metals, fuels and lubricants have been considered, as well as the latest practices available in each field. Chapters on the structure, behavior under load, corrosion and its prevention, and the shaping and forming of metallic materials have been included.

Because of the wide range of materials covered, each topic is given a comparatively brief, but fundamental treatment. Subjects common to all branches of engineering are dealt with in the early chapters so that the student will have a background for the later discussion of topics such as corrosion, metals, cementing, etc. Lists of references for further study are provided.

Indexes to Publications of the American Ceramic Society . . 131 pp. American Ceramic Society, 4055 North High St., Columbus 14, Ohio, 1957.

This new index covers the scientific and technical papers which have appeared in 864 monthly issues of the Society's "Journal" and "Ceramic Bulletin." In addition to text material, important diagrams and tables are indexed. More than 2800 authors are listed. In all, the book includes 16,800 references in the Subject Index, and 6286 references in the Index to Authors.

questions and answers

Misery loves company so why not share your castings problems with us? MODERN CASTINGS invites you to stump the experts with tales of gremlins that are haunting your scrap piles. If any of you readers have better answers to the questions below, write the editor.

vacuum die casting

Q. What are the advantages of vacuum die casting?

A. By completely enclosing the dies in a vacuum chamber during metal injection the following benefits have been derived:

1) Thinner walled castings can be run.
2) Castings are stronger, contain no entrapped gases.
3) Elimination of gas cures blistering problems.
4) With no blistering tendency, castings can be ejected from dies hotter and can also be subjected to heat treatment.
5) Silicon content can be reduced, making alloy more amenable to anodizing.

Q. Is it fact or fancy that tin has an embrittling effect on gray cast iron?

A. Work done at Battelle Memorial Institute in the past year has indicated that tin can really be a beneficial alloying element in gray iron. Tin added to cupola iron proved to have a powerful stabilizing effect on the pearlite in both hyper- and hypo-eutectic iron. Contrary to most carbide stabilizers, tin does not have any tendency to promote chill depth or form massive carbides. This was true even when amounts were added far in excess of that required to produce a completely pearlitic matrix.

Although it depends on the amount of ferrite present when the tin is added, about 0.10% seems to be an optimum amount for getting the all-pearlite structure. As would be expected physical properties improve as pearlite increases. No embrittling effects were noticed when tin was

increased to as high as 0.50%. So don't worry about stray tin-cans in your scrap.

lower the iron

Q. Is iron a detrimental impurity in aluminum alloys?

A. Recent investigations have shown that cast aluminum alloys have definitely improved properties when the iron content is reduced. As a result ingot producers are now making low iron-aluminum alloys. One of the most popular is designated HP 356. HP stands for high purity. This is conventional alloy 356 with the iron content held to a maximum of 0.15%. Although the principal alloying elements are 7% Si and 0.3% Mg, reduction of the iron content from 0.60% to 0.15% has had remarkable beneficial results.

After heat treating 2 hr at 400 F, HP 356 has a tensile strength of 40,500 psi and elongation of 8% compared with 36,200 psi and 3.5% for the standard alloy. Improved ductility and strength are attributed to virtual elimination of the compound beta iron-silicon, which is a brittle constituent appearing in the microstructure as large thin needles and plates.

Q. Have you any suggestions for reducing the level of noise in our foundry?

A. A number of manufacturers market noise control devices, such as isolators, sound absorbers, enclosures, silencers on pneumatic exhausts, etc. Some foundries are replacing noisy equipment or operations with quieter ones. Probably the noisiest job in the shop is casting shakeout. You might consider one or more of the following ways of coping with shakeout noise:

1) Install rubber bumpers or liners on shakeout grid.
2) Isolate the shakeout operation.
3) Enclose shakeout completely with soundproofing material.
4) Provide workers with ear plugs or ear muffs.
5) Shakeout during 2d or 3d shift when fewest employees will be exposed.

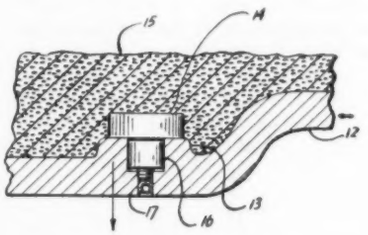
This subject will be covered extensively in the new AFS FOUNDRY NOISE MANUAL scheduled for publication in 1958.

patent review

MELVIN NORD
Consultant in Law and Engineering

Magnets to Hold Chills

Patterns equipped with magnets that hold chills in position for molding or coremaking have been patented. Figure 1 shows a pattern (12) with a boss (13) on which the chill (14) is placed. A magnet (16) is positioned in the boss by a screw (17) threaded into the pattern.



The screw may be used to raise or lower the magnets, thus determining the force with which the chills are held against the pattern. The chills must be held with sufficient force to stay in position as the sand is packed around the pattern, but the force must not be so great that the chills are pulled out of the sand when pattern is drawn. Pat No. 2,775,803 *issued Jan.* 1, 1957 *to Victor E. Zang and Emmett E. Thompson.*

Other Patents

Centrifugal casting device. Patent No. 2,775,801, *Arthur E. Dekome.*

Casting machine. Patent No. 2,775,802, *Gould-National Batteries, Inc.*

Apparatus for adding magnesium to molten cast iron. Pat. No. 2,776,206, *International Nickel Co., Inc.*

Method of forming die cast products on pre-die cast and remeltable cores. Patent No. 2,777,166, *Louis H. Morin.*

Machine for making shell molds. Patent No. 2,778,074, *Shell-O-Matic, Inc.*

Controlling Gas Improves Quality of Die Cast Metal

■ A technique for improving the quality of die castings through control of the gas content has been developed by the British Non-Ferrous Metals Research Association.

A summary appearing in "The New Scientist" states that the gas is used to make the metal porous. As the casting freezes, gas bubbles come out of solution, leaving behind a network of small holes which counteract the tendency of the chilled metal to form undesireable shrinkage cavities. Hydrated salts are stirred into the molten metal, water vapor is driven off and dissociates to give hydrogen.

The process has been modified so that a mixture of gasses is passed directly into the melt. By varying the hydrogen-nitrogen ratio, it is possible to hold the gas at any level.

EASY COME

I wish I had a dollar for every mold I've made
For every day I've come to work to ply the molder's trade.
A buck for every morning driving in the early gloom
To inspect yesterday's production in the cleaning room.
A buck for every ladle poured, for every core I've set
For every furnace heat I've charged and come out soaking wet.
A buck for every season, searing hot and shivering cold
A buck for every job I've closed and strip of mud I've rolled.
I wish I had a buck for every time I've called the crane
And loaded transfer cars with heavy flasks out in the rain.
I'd like to have a dollar for every box of sand
For every lunch I've munched with sticky core paste on my hand.
A buck for every time I goofed and thought I should be fired
A buck for every tough day when I trudged home draggin' tired.
A buck for every graveyard shift, a
A buck for every friendship and a buck for every fight.
But, come to think about it, I've made a lot of dough
The foundry's paid me plenty. Lord, where'd the money go!
Do I have any? No such luck.
I only wish I had a buck.

■ From *The Foundry Bard*, a column of foundry poems appearing in *The ESCO Ladle* of the Electric Steel Foundry Co., Portland, Ore., Bill Walkins, former sand mill operator, is both the editor of the *Ladle* and the one, and original Foundry Bard.

let's get personal

E. W. Horlebein . . president, Gibson & Kirk Co., Baltimore, Md., represented the non-ferrous castings industry at the President's Conference on Technical and Distribution Research for the Benefit of Small Business. Mr. Horlebein is a past president of the American Foundrymen's Society and the Non-Ferrous Founders' Society.

Harold C. Erskine . . has been elected a vice-president of Aluminum Co. of America. Mr. Erskine, a national director of AFS, was recently named general manager of the firm's smelting and fabricating divisions.

Donald L. Colwell . . has been elected vice-president in charge of laboratories and research for Apex Smelting Co., Cleveland. He is currently serving as chairman of the Die Casting Committee, AFS Light Metals Division.

Canton Chaplet & Chill Div., W. L. Jenkins Co., Canton, Ohio, has promoted **Thomas S. Jenkins** to the post of vice-president and secretary and has named **Gale H. Shackelford** to the post of vice-president.

Johnstone Foundries, Inc., Grove City, Pa., has announced a series of appointments and promotions. **George Johnstone III** has been promoted to vice-president and **C. L. Masson** has been promoted to foundry superintendent. **Harold Gassner,** former vice-president of Rosedale Foundry & Machine Co., has been named sales manager.

G. S. Mikhalapov . . former president of Coast Metals, Inc., has been named executive vice-president of Brush Beryllium Co., Cleveland.

P. W. Leming . . has been elected executive vice-president of the Van Norman Machine Co., Springfield, Mass.

Howard E. Jones, Jr. . . has been elected president Jones-Mundle & Co., Detroit.

O. H. Hofman . . has been named vice-president of General Magnetic Corp., Detroit.

J. R. Thorpe . . has been promoted to vice-president, Magline, Inc., Pinconning, Mich.

Kent S. Clow, Jr. . . assistant vice-president and director of James B. Clow & Sons, Inc., Chicago, has been elected vice-president and a director of the Iowa Valve Company, Oskaloosa, Iowa.

Jacob M. Bauer . . chief inspector for Malleable Iron Fittings Co. has celebrated his 60th year with the

G. Johnstone III

C. L. Masson

H. Gassner

103-year old Branford, Conn., firm.

Federated Metals Div., American Smelting & Refining Co., has announced new posts for six executives. **A. M. Callis** becomes general sales manager, **C. J. Williamson** becomes a consultant for the company, **J. L. Griffith** is eastern division sales manager, **E. J. Baker** is eastern division assistant sales manager, **J. L. Kammermeyer** becomes general sales manager of the central aluminum department, and **R. A. Colton** becomes manager of the Houston, Texas plant.

E. C. Zuppann . . has been promoted to foundry manager, Lake Shore plant, Bendix Aviation Corp., Benton Harbor, Mich. Mr. Zuppann is a member of four committees of the AFS Sand Division.

George T. Dupre . . has been appointed general sales manager for National Engineering Co., Chicago. He was formerly assistant to the president of the firm.

G. T. Dupre

Richard B. Kropf . . has been appointed supervisor of development activities in the automotive industry for International Nickel Co., Inc. He will continue to make his headquarters in the Detroit office.

Herbert J. Weber . . AFS Director of Safety, Hygiene, and Air Pollution Control recently completed a speaking tour of six western AFS chapters. He addressed the Southern California, Northern California, Oregon, Washington, British Columbia, and Utah Chapters.

R. L. Rouviere . . has been appointed market extension engineer by Devcon Corp., Danvers, Mass.

W. R. Post . . has been appointed sales engineer for Empire Steel Castings, Inc., Reading, Pa.

Wheelabrator Corp. has announced a series of sales staff changes. **F. E. Noyes** is now St. Louis district manager, **W. L. Hungate** is sales and service engineer in St. Louis, **W. A. Illsley** is Cincinnati district manager, **W. E. Scherrer** is a sales engineer in Cincinnati; **J. F. Underway** is Pittsburgh district manager, and **J. B. Booth** is sales engineer in Los Angeles.

Harold W. Lownie, Jr. . . chief of the process metallurgy research division at Battelle Memorial Institute,

H. W. Lownie, Jr.

Columbus, Ohio, has been elected chairman of the AFS Gray Iron Division.

Miss LaVerne A. Lahn . . AFS membership supervisor and an AFS employee since 1943 was married Sept. 21 to Richard C. Kelso, a former AFS employee.

R. J. Wilcox . . former technical director of Michigan Standard Alloy Castings Co., Detroit, is now at Misco Precision Castings Co. as resident quality manager for Consolidated Foundries & Mfg. Corp.

R. L. Reed . . has been appointed Pittsburgh region sales manager for Electro Metallurgical Co.

D. A. Sandstedt . . has been named Chicago area sales manager for Michigan-Standard Alloy Casting Co. and Misco Fabricators.

E. F. Crimmins . . former chief metallurgist for General Foundry & Mfg. Co., Flint, Mich., is now foundry metallurgist for Kelsey-Hayes Wheel Co.

Lawrence Pope . . formerly associated with Automotive Pattern Co., Detroit, is now consulting engineer, International Div., Ford Motor Co.

Kaiser Aluminum & Chemical Sales, Inc., has announced the appointments of **G. F. Palmer** as assistant general sales manager, **M. C. Crockett** as manager, industry sales, and **S. P. Whiteside** as assistant to the general sales manager.

Julian A. Terpenning . . has been named product manager, foundry resins, for Archer-Daniels-Midland Co., Cleveland. He will be located at the firm's resin laboratory in Newark, N. J.

American Brake Shoe Co. has named **Joseph L. Mullin** as executive vice-president of the American Manganese Steel Division. Also named to posts in the divisional organization were **W. F. Kelly**, vice-president of operations, and **W. E. Crocombe, Jr.**, assistant vice-president of sales.

R. W. Bond . . has been named manager of the sales service department for Corn Products Sales Co., New York.

R. L. MacCallum, Jr. . . has been named a sales engineer for Electro Metallurgical Co. He has been assigned to the Chicago area.

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Let's Get Personal
continued from page 63

T. R. Wiltse . . has been named plant manager of the Defiance, Ohio plant of Central Foundry Div., General Motors Corp. He was formerly factory manager at the plant.

R. W. Gall . . has been appointed sales representative for Buckeye Products Co. in central and southern Indiana.

Dr. Shadburn Marshall . . has been appointed director of metallurgical research for Air Reduction Co., Inc.

R. F. Reid . . has been named sales manager for Arter Grinding Machine Co., Worcester, Mass.

Handlock & Temte Co., Winfield, Ill., precision casting plant, has named **C. E. Ives** as manager of advertising and sales promotion. **James E. Digan** has been named field sales manager.

R. H. Filsinger, Jr. . . has been elected vice-president in charge of sales for Vanadium Corp. of America. Mr.

R. H. Filsinger, Jr.

Filsinger has been associated with the corporation since 1939 and was previously assistant vice-president.

R. E. Savage . . has been named to head the distributor sales section, Nickel Dept., International Nickel Co., Inc., New York.

J. R. Davis . . has been named southeastern representative for the machine division, Osborn Mfg. Co., Cleveland.

A. W. Blecker . . has been named assistant sales manager of Lebanon Steel Foundry, Lebanon, Pa.

Larson E. Wile . . has been appointed foundry superintendent of Wysong & Miles Foundry, Inc., Greensboro,

L. E. Wile

N. C. He was formerly associated with Lynchburg Foundry Co., Lynchburg, Va.

D. L. LaVelle . . has been promoted to product manager for pig, ingot, and billet sales of Kaiser Aluminum & Chemical Sales Inc., Chicago. He is also chairman of the Light Metals Division of AFS.

S.F.S.A. Names Winners in Development Contest

■ Winners of the 3d Product Development Contest of the Steel Founders' Society of America have been announced as Joe Jopling, Phil H. Edwards Construction Engineers, Ft. Worth, Texas, Class I, and Donald N. Rosenblatt, American Foundry & Machine Co., Salt Lake City, Utah, Class II.

The contest required the preparation of papers that reveal design, administrative, and service factors influencing the use of steel castings. Class I was open to engineers, designers, users, and customers of steel foundries; Class II was for personnel of steel foundry organizations.

Mr. Jopling's entry, winner of a $1,000 prize, was titled, "Composite Weld Construction for Rock Ripper Frame."

Other national award winners in Class I include Russell W. Henke, Russ Henke Associates, Elm Grove, Wisconsin $750 for his paper entitled "Analytical Design Leads to Replacement of Weldments with Steel Castings in Compaction Heavyweight"; Robert Eichenberg, McEvoy Co., Houston, Texas, $400; Kenneth E. Jones, Joe Stine Inc., Houston, Texas, $200; and Samuel K. Hodgson, Chance Vought Aircraft Co. Inc., Dallas, Texas, $100.

Mr. Rosenblatt's paper was entitled "Use of Steel Castings in Mining Equipment". Other national award winners in Class II include American Steel Foundries, East Chicago, Indiana, $750; L. W. Songer and E. S. Frens, General Electric Co., Schenectady, New York, $400; Robert H. McAllister, Los Angeles Steel Casting Co., Los Angeles, California, $200; and Lawrence S. Krueger and Clarence Ancher, The Pelton Steel Casting Co., Milwaukee, Wisconsin, $100.

In addition to the above, Divisional Awards in Class II of $100 and Gold Certificate; $50 and Silver Certificate; and $25 and Bronze Certificate were made in each of the eight geographical divisions of the Society.

Members of the Society's Product and Market Development Committee which conducted the Contest are:

R. A. Gezelius, Asst. Vice President, General Steel Castings Corp., Eddystone, Pa.—*Chairman*

M. J. Allen, Director, Personnel & Public Relations, American Steel Foundries, Chicago 1, Illinois

A. A. Diebold, Vice President—Sales & Operations, Atlas Steel Casting Co., Buffalo 7, New York

T. R. Eggert, Sales Engineer, The L.F.M. Division, Rockwell Mfg. Co., Atchison, Kansas

AFS news

Fundamentals of Safety, Hygiene to be Discussed at Beloit, Wis.

■ Lost man-hours represent decreased production for foundry management and payless days for employees. Preventing these losses through safe practices in the foundry will be covered in a comprehensive two-day training course, Nov. 21-22, at the Beloit Vocational and Adult School, Beloit, Wis.

This American Foundrymen's Society educational course on "Fundamentals of Foundry Health & Safety," will be sponsored by the Northern Illinois & Southern Wisconsin, Wisconsin, and University of Wisconsin Student Chapters of AFS.

The program will point out to foundry management the vast influence that employee health and safety has upon all phases of production. Courses are designed to serve as a direct help to foundry management in controlling the health and safety problem and in reducing costs.

Lectures, movies, discussion periods, slides, and demonstrations will be used to illustrate the fundamental causes and methods of controlling disabilities.

The program:

THURSDAY, NOVEMBER 21

Morning Session

Registration

Introduction and Welcome, R. A. Oster, AFS National Director.

"The Economic Advantages of Accident Prevention," H. J. Weber, AFS Director of SH&AP.

"What Was Your Most Expensive Accident in 1957?", by the conference.

"Workmen's Compensation," J. J. Bloomquist, Employers Mutual of Wausau.

"Causes and Sources of Foundry Accidents," J. Young, International Harvester Co.

"Accident Facts," appraising safety performances, (A.S.A. method), W. Hanau, Fidelity & Casualty Co. of New York.

Lunch

Afternoon Session

"Foundry Fire Protection," demonstration, M. J. Dalton, Great Lakes Fire Equipment Co. and W. Vodak, Pyrene Mfg. Co.

"First Aid," demonstration, J. J. Banack, Ansul Chemical Co.

"Personal Protective Equipment," demonstration, J. H. Helm, Mine Safety Appliances Co.

"Why Clean Up and Paint Up A Foundry," color slides, I. M. Emery, Massillon Steel Castings Co.

FRIDAY, NOVEMBER 22

Morning Session

"Foundry Chains.– Their Maintenance and Safe Use," J. Hogans, Fairbanks Morse & Co.

"Head to Toe Eye Safety," B. C. Reichelderfer, Caterpillar Tractor Co.

"How to Lift," demonstration, J. G. Williams, Minneapolis Electric Steel Castings Co.

"The Perfect Crime," film dealing with safety attitudes, B. C. Reichelderfer.

"Industrial Hygiene," slides, W. Scholtz, Allis-Chalmers Mfg. Co.

Beloit Vocational School

Afternoon Session

"Foundry Hygiene Problems," H. J. Weber.

"General Principles of Foundry Ventilation," H. J. Weber.

"Foundry Ventilation," movie, American Air Filter Co.

"How to Control Radiant Heat," demonstration, W. Hazard, Owens Illinois Glass Co.

"The Right and Wrong Way of Heating a Foundry," K. Robinson, General Motors Corp.

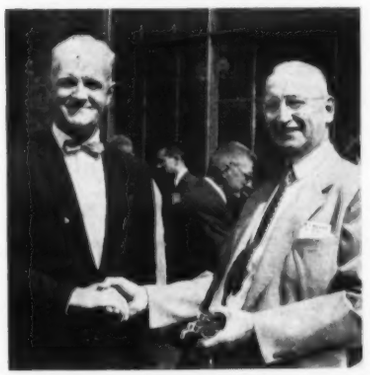
"Foundry Hazards Not Previously Discussed," H. J. Weber.

True & False Examination, A. B. Sinnett, AFS Assistant Secretary.

"The Foundry — A Better Place to Work," N. Amrhein, Chairman, Wisconsin Chapter.

"Let's Put It Into Practice," H. M. Bacon, Chairman, Northern Illinois-Southern Wisconsin Chapter.

Summation, R. A. Oster.



Whitin Machine Works, Whitinsville, Mass., was host to 175 members of the **New England Chapter** Sept. 12. The group toured the company's foundry, one of the largest iron foundries in New England. A social hour was held at the Whitinsville Country Club, followed by dinner and movies in the company cafeteria. R. F. Meader, foundry superintendent, Whitin Machine Works, was chairman of the arrangements committee. He was assisted by A. Beck, New England chapter chairman, and W. Ohlson, chapter first vice-president. Picture shows Mr. Beck on the left and Mr. Meader who holds safety glasses provided for the touring foundrymen.

Discuss Glascast at Rochester

Rochester Chapter's opening technical program in September featured a talk on *"The Glascast Disposable Pattern Process,"* presented by J. C. Hayman, E. M. Baker, and P. C. Lovette, Sr., Corning Glass Works, Corning, N. Y. The speakers outlined the development of the process developed by Corning Glass Works and Massachusetts Institute of Technology, Cambridge, Mass.

Quad City Starts Meetings

Approximately 100 members of the **Quad City Chapter** attended the first meeting of the 1957-58 season held Sept. 16 at the Fort Armstrong Hotel, Rock Island, Ill. Before the technical meeting M. Harris, Deere & Co., spoke about his experiences in the lighter-than-air division of the Air Corps.

H. Felton, Peoria Malleable Casting Co., Peoria, Ill., talked on *"Pattern Equipment and its Relation to Quality Control."* A question and answer session followed Mr. Felton's speech. M. H. Horton, chapter chairman presided. G. Verbeke, John Deere Malleable Works, East Moline, Ill., served as technical chairman.

Non-Ferrous Talk at Tri-State

Tri-State Chapter members at the September meeting heard W. M. Ball, Jr., R. Lavin & Sons, Inc., Chicago, discuss *"How Melting of Brasses and Bronzes Affects the Quality of Castings."* He stated that the most important factors in producing a sound casting in brass and bronze are melting, molding sands, and gating. Other important factors are full furnace control and processing the metal to the

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Cincinnati Chapter's first meeting of the 1957-58 season combined two technical sessions and Past Chairman's Night. E. E. Pollard, Tyler Pipe & Foundry Co., Tyler, Texas, addressed a ferrous session on *"The Water-Cooled Cupola at Tyler,"* Wm. Romanoff, H. Kramer & Co., Chicago, spoke to the ferrous group on *"Brass & Bronze Foundry Practice."* Shown in the photo are the speakers and past chairmen. Top row, speakers table, left to right, E. H. King (1943-44); Speaker Pollard; E. J. James (1957-58); Speaker Romanoff; G. E. Schultz, non-ferrous technical chairman. Past chairman's table, left to right: W. L. Oberhelman (1953-54); A. W. Schneble (1951-52); M. E. Rollman (1950-51); W. J. Klayer (1949-50); J. D. Judge (1948-49); A. D. Barczak (1947-48); J. S. Schumacher (1946-47); Wm. Rengering (1945-46); B. A. Genthe (1952-53); W. M. Ball, Jr., (1941-42); and H. F. McFarland (1940-41). Absent were H. Ewig (1938-40); F. E. Hutchinson (1942-43); J. D. Sheley (1955-56); and R. J. Westendorf (1956-57).

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Tri-State Chapter

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fullest extent.

Mr. Ball emphasized the patching of ladles and furnaces. He added that tapping time and pouring temperature are critical. High temperature has been found to cause cracks and porosity. He recommended that the melting cycle be kept under close control, using a 10 to 1 air to gas ratio for refining the metal.

San Antonio Opens Season

Modern grinding practices were discussed at the opening meeting of the **San Antonio Section.** V. Lagaly, Standard Electric Tool Co., Cincinnati, was the featured speaker. W. Mickel, K. O. Electric Steel Foundry, presided.

Weber Speaks at Oregon

Oregon's legislation on air pollution was discussed at the September meeting of the **Oregon Chapter** by H. J. Weber, AFS Director of Safety, Hygiene and Air Pollution Control. Referring specifically to Oregon, Mr. Weber stated that Oregon law is the only state law which is directed to control air polution nuisance or damage where it is occuring.

This concept is sound, Mr. Weber said, but unless definite limitations on stack emissions are fixed, the law is subject to capricious enforcement since the degree of control required can vary with opinions of inspectors. Efforts to change this law on an engineering level have failed, he explained.

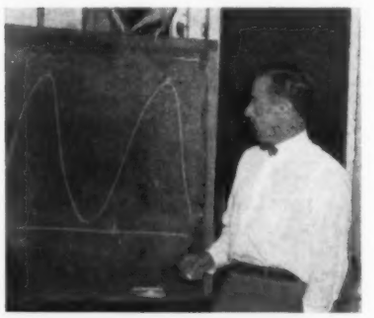
Nearly 400 foundrymen attended the **Central Indiana Chapter** annual picnic held in September. In addition to golfing events members played softball and horseshoes.

Timberline Holds Picnic

A family picnic Sept. 8, opened the 1957-58 season for the **Timberline Chapter.** More than 200 attended. The chapter will make the picnic an annual affair. Committee chairmen for the event were, W. Chivvis, Magnus Metal Div., National Lead Co.; P. Ross, American Manganese Steel Div., American Brake Shoe Co.; J. Taleck, Colorado Pattern Co.; C. Gerbig, Denver Fire Clay Co.; and A. Neal, U. S. Foundries, Inc.

The technical program was opened in September with a round table discussion on casting defects. Each local foundry submitted examples for evaluation.

Legislation affecting foundries was explained to **Washington Chapter** members at the September meeting by H. J. Weber, AFS Director of Safety, Hygiene and Air Pollution Control. Shown in photo left to right are Program Chairman, V. W. Rowe, Ballard Pattern & Brass Foundry, Seattle, Wash.; speaker Weber, Chapter Chairman W. K. Gibb, Atlas Foundry & Machine Co., Tacoma, Wash.; and AFS National Director Herbert Heaton.



Green sand molding was discussed at the September meeting of **the Central Ohio Chapter** meeting at the Seneca Hotel, Columbus, Ohio. The evening's speaker was T. E. Barlow, Eastern Clay Products Dept., International Minerals & Chemical Corp., Chicago. Mr. Barlow stated that higher production and greater precision dictates the use of higher strength of green sand. He recommended increasing the fineness of sand for improved casting finish. Among his other observations were: non-uniformity of ramming molds gives non-uniformity of mold hardness resulting in buckling and scabbing; sand testing should be done for better sand control rather than maintaining daily records. The speaker recommended wider sand grain distribution in molding sand for better control.

Twin City Chapter Opens with Discussion on CO_2

Twin City Chapter activities opened in September with F. M. Scaggs, Oklahoma Steel Castings Co., Tulsa, Okla., speaking about the CO_2 process. Oklahoma Steel, he stated, makes most cores by this process. Mr. Scaggs said that zircon sand is often used in core mixtures to give greater refractory properties. The fol-

Twin City (Cont.)

lowing core mixtures were cited as standard: 300 lb silica sand, 55 gfn; 15 lb sodium silicate binder; 2 lb cereal; 3 lb pitch, 4 lb kaolin clay. The clay has an analysis of: 45.21% silica, 39.61% alumina, 0.41% iron, 1.15% titanium, 13.25% combustibles, and water. Mr. Scaggs said that reclamation of core sands successfully removes silicate residues.

J. J. Uppgren, chapter chairman, presided. The following committee chairmen outlined their activities for the year: program, R. J. Mulligan; membership, H. Blumenthal; publicity, J. D. Johnson; education, M. P. Schroeder; roster, H. Jacobson; and safety, C. DeLaittre.

A picnic was held at the September meeting of the **Cornbelt Chapter.** Poor weather forced most activities to be held inside.

Coremaking at New York

Coremaking problems and practices were featured at the September meeting of the **Eastern New York Chapter** held at Menands, N. Y. Featured speaker was C. W. Mooney, Jr., Olney Foundry Div., Link-Belt Co., Philadelphia.

Mr. Mooney listed the use of the correct sand as the major factor in coremaking. Other subjects covered were binders and water. The speaker also discussed experimental work carried out by Olney Foundry and the benefits obtained from an apprentice department.

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committees in action

■ Preliminary steps have been taken for establishing new recommendations for sand sampling. Basic data to support such a recommended method, followed by an educational program on recommended procedures of sampling and screen analysis is essential, it was pointed out at the September meeting of the Grading, Fineness & Distribution Committee of the Sand Division.

Members of the committee will be given a 50 gram and a 3 lb sand sample and requested to run a screen analysis. Original samples of 400 grams will be split four times to yield eight final samples. An AFS 60 sand will be used for the tests.

A 5-man sub-committee was appointed to prepare 60 pages of the SAND TESTING HANDBOOK.

Other committee actions dealt with progress in the clay test, definition of fraction, and the determination of true clay.

afs chapter meetings

NOVEMBER

Birmingham District . . Nov. 8 . . Thomas Jefferson Hotel, Birmingham, Ala. . . T. E. Barlow, Eastern Clay Products Dept., International Minerals & Chemical Corp., *"Green Sand Molding."*

British Columbia . . Nov. 15 . . Pacific Athletic Club, Vancouver, B. C. . . W. R. Jaeschke, Whiting Corp., *"New Developments in Cupola Operation."*

Canton District . . Nov. 7 . . Ford Motor Co., Cleveland, *Plant Visitation.*

Central Illinois . . Nov. 4 . . American Legion Hall, Peoria, Ill. . . W. L. Naumann, Caterpillar Tractor Co. *University of Illinois Student Chapter Night.*

Central Indiana . . *See Purdue Metals Casting Conference.*

AFS news

AFS Meetings (cont.)

Central Michigan . . Nov. 20 . . Hart Hotel, Battle Creek, Mich.

Central New York . . Nov. 8 . . Onondaga Hotel, Syracuse N. Y. . . *Round-Table Discussion.*

Central Ohio . . Nov. 11 . . Seneca Hotel, Columbus, Ohio . . H. E. Henderson, Lynchburg Foundry Co., *"Cupola Operation—Conventional and Water-Cooled."*

Chesapeake . . Nov. 22 . . Engineers' Club, Baltimore, Md. . . J. H. Ricky, Jr., Ironton Fire Brick Co., *"Economic Considerations in Refractory Ladle Practice."*

Chicago . . Nov. 4 . . Chicago Bar Association, Chicago . . *Division Meeting; Student Night; Robert E. Kennedy Scholarship Award.* Gray Iron Group: B. G. Gray, Air Reduction Co., *"Altering Properties & Structure of Cast Iron by Injection Method"; Malleable, Steel* Group: M. F. Surls, Charles C. Kawin Co., *"Advanced, Rapid, Metallurgical Analysis by Instrumentation"*; Management, Maintenance Group: E. E. Schulze, Stevenson, Conaghan, Velde & Hackbert, *"New Chicago Smoke Ordinance"*; Pattern, Non-Ferrous Group: A. B. DeRoss, Kaiser Aluminum & Chemical Sales, Inc., *"Casting Aluminum Alloys."*

Cincinnati District . . Nov. 11 . . Sutmiller's, Dayton, Ohio . . R. H. Greenlee, Auto Specialties Mfg. Co., *"Modern Core Practice."*

Connecticut . . Nov. 26 . . Waverly Inn, Chesshire, Conn. . . *Round-Table Discussions on Brass, Bronze, Aluminum, Gray Iron, Malleable, Steel.*

Corn Belt . . Nov. 13 . . Fireside Restaurant, Omaha, Neb. . . M. K. Young, United States Gypsum Co., *"Epoxy Resins."*

Detroit . . Nov. 21 . . Tuller Hotel, Detroit . . O. J. Myers, Reichhold Chemicals, Inc., *"Rosin or Resin."*

Eastern Canada . . Nov. 8 . . Sheraton-Mt. Royal Hotel, Montreal, Que. . . *Three New Molding Methods*: J. H. King, Archer-Daniels-Midland Co. Ltd., *"Core Oils"*; V. H. Furlong, Foundry Services Ltd., *"CO_2 Process"*; and W. R. Moggridge, Ford Motor Co. of Canada, *"Shell Molding."*

Eastern New York . . Nov. 19 . . Panetta's Restaurant, Menands, N. Y. . . O. V. Guenther, Hudson Technical Institute.

Metropolitan . . Nov. 4 . . Essex House, Newark, N. J. . . H. H. Kessler, Sorbo-Mat Process Engineers, *"Gating & Risering."*

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AFS news

AFS Meetings (cont.)

Mexico . . Nov. 18 . . Mexico, D. F. . . C. L. Adovasio, Cia Industrial del Norte, S A., *"Production of Malleable Castings."*

Michiana . . Nov. 11 . . Club Normandy, Mishawaka, Ind. . . Ferrous Group: R. A. Clark, Electro Metallurgical Co., Div. Union Carbide Corp. *"Charging Materials for Cupola Melting"*; Non-Ferrous Group: W. Ball, Jr. R. Lavin & Sons, Inc., *"How Melting of Brasses & Bronzes Affects Quality of Castings."*

Mid-South . . Nov. 8 . . Claridge Hotel, Memphis, Tenn. . . S. A. Schack, Federated Metals Div., American Smelting & Refining Co., *"Non-Ferrous & Foundry Alloys."*

Mo-Kan . . Nov. 1 . . Fairfax Airport, Kansas City, Kans. . . *Films, "Technique for Tomorrow"* by Ford Motor Co. and *"Mechanization for Small Foundries"* by Beardsley & Piper Div., Pettibone Mulliken Corp.

New England . . Nov. 13 . . University Club, Boston . . W. Carlson, Carlson Pattern Shop, Inc., *"Patterns & Profit."*

Northeastern Ohio . . Nov. 14 . . Tudor Arms Hotel, Cleveland . . W. B. Bishop, Jr., Archer-Daniels-Midland Co., *"Which Core Process?"*

Northern California . . Nov. 11 . . Spenger's, Berkeley, Calif. . . W. R. Jaeschke, Whiting Corp., *"New Developments in Cupola Operation."*

Northern Illinois & Southern Wisconsin . . Nov. 12 . . Country Club, Beloit, Wis. . . D. E. Wyman, Exomet, Inc., *"Exothermic & Insulating Materials as Aids to Better Feeding."*

Northwestern Pennsylvania . . Nov. 25 . . Amity Inn, Erie, Pa. . . Dr. F. W. Boulger, Battelle Memorial Institute, *"Deoxidizing of Steel."*

Ontario . . Nov. 15 . . Hotel London, London, Ont. . . F. G. Steinebach, Penton Publishing Co. and L. Schuman, National Malleable & Steel Castings Co.

Oregon . . Nov. 13 . . Heathman Hotel, Portland, Ore. . . W. R. Jaeschke, Whiting Corp., *"New Developments in Cupola Operation."*

Philadelphia . . Nov. 8 . . Engineers' Club, Philadelphia . . G. F. Watson, American Brake Shoe Co., *"Casting Defects Caused by Sand."*

Piedmont . . Nov. 1 . . Hotel Charlotte, Charlotte, N. C. . . J. A. Gitzen, Delta Oil Products Co., *"Cores and Core Washes."*

AFS news

AFS Meetings (cont.)

Pittsburgh . . Nov. 18 . . Hotel Webster Hall, Pittsburgh, Pa. . . W. H. Dawson, Kelsey-Hayes Wheel Co., *"Water-Cooled Cupola Operations."*

Purdue Metals Casting Conference . . Oct. 31-Nov. 1 . . Purdue University, Lafayette, Ind.

Quad City . . Nov. 18 . . Ft. Armstrong Hotel, Rock Island, Ill. . . D. Matter, Ohio Ferro-Alloys Corp., *"Nodular Iron Production Control & Application."*

Rochester . . Nov. 12 . . Hotel Seneca, Rochester, N. Y. . . H. von Wolf, Shalco Engineering Corp., *"Shell Cores."*

Saginaw Valley . . Nov. 7 . . Fischer's Hotel, Frankenmuth, Mich. . . R. A. Clark, Electro Metallurgical Co., Div. Union Carbide Corp., *"Control of Raw Materials,"* and C. Hitchcock, R. C. Hitchcock & Sons, Inc., *"Light Metals Castings."*

St. Louis District . . Nov. 14 . . Edmond's Restaurant, St. Louis . . W. L. Adams, Eastern Clay Products Dept., International Minerals & Chemical Corp., *"High Pressure Molding."*

Southern California . . Nov. 8 . . Rodger Young Auditorium, Los Angeles . . W. R. Jaeschke, Whiting Corp., *"New Developments in Cupola Operation."*

Tennessee . . Nov. 22 . . Hotel Patten, Chattanooga, Tenn. . . C. E. Wenninger, Beardsley & Piper Div., Pettibone Mulliken Corp., *"Digging Into Sand Fundamentals."*

Texas . . Nov. 15 . . Lone Star Steel Co., Lone Star, Texas . . *Plant Visitation.*

Texas, East Texas Section . . Nov. 15 . . *Joint Meeting with Texas Chapter.*

Timberline . . Nov. 11 . . Oxford Hotel, Denver, Colo. . . M. K. Young, United States Gypsum Co., *"Plastic & Plastic Tooling."*

Toledo . . Nov. 6 . . Heather Downs Country Club, Toledo, Ohio . . D. Hayes, Laverick & Haines, *"Latest Legislative Developments on Occupational Loss of Hearing."*

Tri-State . . Nov. 15 . . Coffeyville, Kans.

Twin City . . Nov. 20 . . Calhoun Beach Club, Minneapolis . . F. S. Badger, Haynes Stellite Co., Div. Union Carbide Corp., *"Precision Investment Castings." Joint meeting with local chapter of A.S.M.*

Utah . . Nov. 18 . . Salt Lake City . . W. R. Jaeschke, Whiting Corp., *"New Developments in Cupola Operation."*

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AFS news

AFS Meetings (cont.)

Washington . . Nov. 14 . . Engineers' Club Seattle . . *W. R. Jaeschke,* Whiting Corp., *"New Developments in Supola Operation."*

Western Michigan . . Nov. 4 . . Finger's, Grand Rapids, Mich. . . Panel Discussion, *"Precision Molding Methods."*

Western New York . . *No meeting because of Niagara Frontier Regional Conference.*

Wisconsin . . Nov. 8 . . Schroeder Hotel Milwaukee . . *Five Sectional Meetings.*

DECEMBER

Canton District . . Dec. 7 . . American Legion Club, Massillon, Ohio . . *2d Annual Ladies' Nite Dinner Dance.*

Central Illinois . . Dec. 14 . . American Legion Hall, Peoria, Ill. . . *Annual Christmas Party.*

Central Indiana . . Dec. 2 . . Athenaeum Turners, Indianapolis . . Panel: K. Williams, Link-Belt Co., R. G. Kimble, Fabricast Div., GMC, C. A. Newmier, Frank Foundries Corp. and C. Neese, Electric Steel Castings Co. Moderator: B. E. Gavin, National Malleable & Steel Castings Co. *"Finishing Operations on Castings."*

Central New York . . Dec. 14 . . Onondaga Hotel, Syracuse, N. Y. . . *Christmas Party.*

Cincinnati District . . Dec. 21 . . Netherland Hilton Hotel, Cincinnati . . *Christmas Party.*

Corn Belt . . Dec. 14 . . Lincoln, Neb. . . *Christmas Party.*

Eastern Canada . . Dec. 13 . . Sheraton-Mt. Royal Hotel, Montreal, Que. . . J. G. Dick, Canadian Bronze Co. Ltd., *"Old and New Ideas in Bronze Casting."*

Metropolitan . . Dec. 13 . . Essex House, Newark, N. J. . . *Christmas Party.*

Mo-Kan . . Dec. 7 . . President Hotel, Kansas City, Mo. . . *Christmas Party.*

New England . . Dec. 10 . . University Club, Boston . . *Ladies' Night.*

Northeastern Ohio . . Dec. 6 . . Tudor Arms Hotel, Cleveland . . *Christmas Stag Party.*

Northern California . . Dec. 16 . . Spenger's, Berkeley, Calif. . . *Casting Clinic.*

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foundry trade news

Erie Forge & Steel Corp. . . has undertaken a $5,000,000 expansion program which includes the addition of a 75-ton electric furnace and the construction of a modern steel foundry.

American Steel Foundries . . has announced that its Canadian subsidiary, Griffin Steel Foundries Ltd., will build its second plant for the production of railroad car wheels at Transcona, Manitoba.

Crown Brass Mfg. Co. . . Alhambra, Calif., has expanded facilities to produce a more diversified line of nonferrous castings.

Walworth Co. . . has begun construction of a $5,000,000 brass valve plant and a research and engineering center at Braintree, Mass. The two buildings, scheduled for completion late in 1958, will consolidate many of the company operations now being performed in Boston.

Caterpillar Tractor Co. . . has announced the first commercially successful attempt to produce boron-bearing cast carbon steel by the acid open hearth process. The first parts being produced from the metal are crawler tractor sprockets. The sprocket was developed as a cooperative research project between Caterpillar and Harrison Steel Castings Co., Attica, Ind.

Bell & Howell Co. . . Chicago firm reports that it is the first photographic manufacturer to produce in its own plant die castings for camera and projector parts.

Soc. Tecnica de Fundicoes Gerais, S.A. . . Sao Paulo, Brazil, iron foundry has received a $2,558,000 from the Export-Import Bank for the purchase of foundry equipment and machine tools in the U. S. The plant is the largest jobbing foundry in Brazil.

Fly Ash Arrestor Corp. . . Birmingham, Ala., manufacturer of dust collectors, fans, ductwork, and dampers has been elected to membership in the Foundry Equipment Manufacturers' Association, Inc.

Employees of seven foundry firms have recently organized credit unions. The plants are: **Cal-Metal Pipe Corp.**, Baton Rouge, La.; **Joseph T. Ryerson and Son, Inc.**, Detroit; **Precision Castparts Corp.**, Portland, Ore.; **Vulcan Mold and Iron Co.**, Latrobe, Pa.; **American Forge & Mfg. Co.**, McKees Rocks, Pa.; **Richmond Steel Co., Inc.**, Richmond, Va.; and **Kupfer Foundry & Iron Co.**, Madison, Wis.

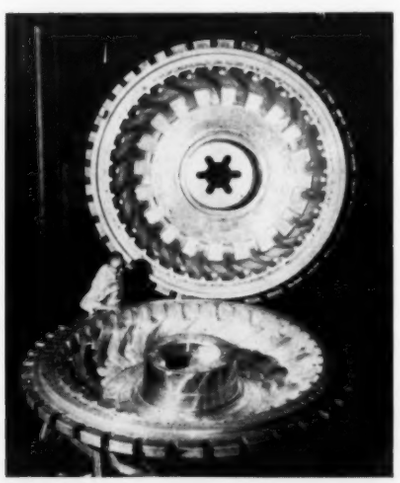
Whitehead Metal Products Co. . . New York firm will market the products of Shieldalloy Corp. in 13 northeastern states.

Wheelabrator Corp. . . has established a Canadian division with a plant in Scarborough, Ontario. The firm has been active in the Canadian market for 12 years with sales offices in Toronto and Montreal.

Brush Beryllium Co. . . Cleveland firm has completed a new plant at Elmore, Ohio. The $4,500,000 facility will produce 20,000 lb per month of beryllium in hydroxide form and also 10,000 lb of vacuum cast metal.

Electro Metallurgical Co. . . Union Carbide Corp. division is building an addition to its Process Research Building to more than double space pres-

Continued on page 74



Twin aluminum tire mold sections are the largest light metal castings in the world. Aluminum Co. of America's Cleveland foundries cast the mold back-up sections for Goodyear Tire and Rubber Co. The molds have a combined weight of almost 8 tons and are 8 ft. 10 in. in OD. Section thickness ranges from 3½ to 10 in. Cores and mold were hardened with CO2. Metal was 355 aluminum alloy poured at 1350F.

Foundry Trade News

Continued from page 73

ently available for research in chemical metallurgy. Materials developed in this laboratory at Niagara Falls, N.Y., will be among the metallurgical products manufactured and sold by the firm's newly established Fine Metals and Chemical Division. Executives of the new division are: C. M. Brown, manager; T. R. Evans, metallurgical engineer in charge of sales; and L. A. Stoyell, metallurgical engineer in charge of manufacturing.

Vanadium Corp. of America . . has placed in operation a new ferro-alloy plant in Jefferson County, Ohio. The plant, known as the Vancoram Plant, consists of nine buildings and employs about 300 people.

American Die Casting Machinery Co. . . has moved its plant to 1744-56 W. Winona Ave., Chicago.

Chicago Eye Shield Co. . . has moved to a new plant at 2727 West Roscoe,

Chicago. Productive area in the new plant is 50 per cent greater than in the previous location.

Apex Smelting Co. . . has acquired full ownership of National Metallurgical Corp., Springfield, Ore. This plant has been engaged in the experimental production of aluminum silicon alloys and silicon metal. Apex formerly shared the ownership of National Metallurgical with American Smelting and Refining Co.

Nuclear Systems . . Budd Co. division has announced reductions of 50 to 70 per cent in the price of cobalt 60 sources sold commercially.

Thor Power Tool Co. . . Chicago, manufacturer of portable air and electric tools, has acquired Drying Systems, Inc. of Chicago in a cash purchase. It will be operated as a division of Thor, producing equipment for cleaning, drying, baking and finishing of products through industrial air conditioning and heat processing.

Corn Products Refining Co. . . has adopted a new corporate symbol which symbolizes a cross-section of corn. Currently a packaging and de-

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Foundry Trade News

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sign study is being made on the entire consumer and industrial products.

Conap Co. . . Olean, N. Y., research and development organization has been formed for the formation and application of synthetic materials. Russell M. Houghton, formerly president of Houghton Laboratories, Inc., is sole proprietor.

Yale & Towne Mfg. Co. . . has established a Yale industrial lift truck replacement parts depot at San Leandro, Calif.

Aluminum Co. of America . . guarantees its pig aluminum to be no less than 99.4 per cent pure, reportedly making it the first producer to make this guarantee.

H. K. Porter Co. . . New York, has acquired Cleveland Hardware & Forging Co., Cleveland, manufacturers of drop forgings and automotive and commercial hardware and die castings. The firm will be known as the Cleveland Division, H. K. Porter Co. Sales of the newly acquired firm have been approximately seven mil-

Institute of Scrap Iron & Steel . . has released its 18th yearbook summing up the activities of the scrap industry in 1956. Domestic scrap consumption was the highest in the industry with the exception of 1955.

Consumption of copper raw materials by brass and bronze foundries, 1952-1956, ranged from a low of 751,333,000 lb in 1954 to a high of 887,379,000 in 1955 according to figures released by the U. S. Dept. of Commerce Business & Defense Services Administration. During 1956 a total of 861,338,000 lb were used. In this 5-year period shipments of brass and bronze foundry products ranged from a low of 853,808,000 lb in 1954 to a high of 999,096,000 in 1955. Shipments for 1956 were 978,757,000 lb.

Houghton Laboratories, Inc. . . Olean, N. Y. has named Donald Roon as vice-president and succeeds Russell president. He was formerly executive M. Houghton who resigned.

American Gilsonite Co. . . a joint affiliate of Barber Oil Corp. and Standard Oil Co. of California, is the first privately-financed commercial operations to produce high-octane gasoline from a solid hydrocarbon, Gilsonite, which is mined in Utah and transported over the world's first pipeline to cross a mountain range. Another major product is high-purity metallurgical coke used by aluminum producers and other specialty carbon users. The daily production is 275 tons of electrolytic coke and 1300 barrels of gasoline.

National Carbon Co. . . Union Carbide Corp. division has reorganized its sales department. Field salesmen will specialize in one of three distinct product groups: industrial carbon; brush, railroad, and spectroscopic products; and arc carbons. Continuing as sales manager of each of these groups are: A. W. Wolff, W. C. McCosh, and J. W. Cosby.

Michael Wood Products, Inc. . . has completed a new plant at Garfield, N.J., for the production of wood flour.

Kelsey-Hayes Wheel Co. . . Detroit firm has announced the acquisition of Heintz Manufacturing Co., Philadelphia. The company also recently purchased 40 per cent interest in National Centrifugal Casting Corp., Burbank, Calif.

Buick Motor Div. . . will use nearly twice as much aluminum in some of its 1958 models as it did last year. Some models will use as much as 95 lb of aluminum compared to about 50 lb in 1957.

Seventy-four items, ranging from a part for the clock assembly that weighs only a fraction of an ounce to a 26-lb case for the automatic transmission, will be made entirely of aluminum.

In addition to the transmission case, other large parts made of aluminum include front brake drums, pistons, a panel on the rear fenders, and several pieces of interior trim.

About 180 lb is saved by the use of these aluminum parts, the company reports.

The average 1958 model car will use about 50 lb of aluminum, according aluminum industry spokesmen.

James P. Mitchell . . U. S. Secretary of Labor believes that the current shortage of skilled craftsmen in the country is due, in part, to the fact that the pay differential between skilled and semi-skilled workers has not been great enough to encourage workers to become craftsmen.

Pirating of skilled workers from other companies is not the answer to this problem, Secretary Mitchell stated. Industry should stop using its money and ingenuity to court trained workers, and use it on training programs to assure a continuing supply of workers, according to Mr. Mitchell.

AFS news

AFS Meetings (cont.)

Northern Illinois & Southern Wisconsin . . Dec. 7 . . Hotel Faust, Rockford, Ill. . . *Christmas Party.*

Ontario . . Dec. 20 . . Royal Connaught Hotel, Hamilton, Ont. . . J. P. Lubenkov, Link-Belt, Ltd., G. M. Johnston, Neptune Meters, Ltd., and T. Tafed III, American Standard Products (Can.) Ltd., *"Cost Control."*

Oregon . . Dec. 14 . . Multnomah Hotel, Portland, Ore. . . *Christmas Dance.*

Philadelphia . . Dec. 10 . . Engineers' Club, Philadelphia . . *Christmas Party.*

Piedmont . . *No Meeting.*

Pittsburgh . . Dec. 9 . . Penn Sheraton Hotel, Pittsburgh, Pa. . . *Christmas Party.*

Quad City . . Blackhawk Hotel, Davenport, Iowa . . *Christmas Party.*

Rochester . . Dec. 3 . . Gleason Works, Rochester, N. Y. . . *Foundry Tour.*

Saginaw Valley . . Dec. 5 . . Fischer's Hotel, Frankenmuth, Mich. . . W. R. Weaver, Modern Pattern & Plastics, Inc. and A. Kerr, Bakelite Co., Div. Union Carbide Corp., *"Use of Plastics in the Foundry."*

Texas, East Texas Section . . Dec. 13 . . Tyler, Texas . . W. F. Leonard, Jr., The Southland Corp., *"Safety."*

Texas . . Dec. 6 . . Student Memorial Center, College Station, Texas.

Toledo . . Dec. 4 . . Heather Downs Country Club, Toledo, Ohio . . F. G. Steinebach, Penton Publishing Co., *"Future of the Foundry Industry."*

Tri-State . . Dec. 14 . . Mayo Hotel, Tulsa, Okla. . . *Annual Christmas Party.*

Twin City . . Dec. 14 . . Leamington Hotel, Minneapolis . . *Annual Christmas Party.*

Utah . . Dec. 16 . . Provo, Utah . . *Christmas Party.*

Western Michigan . . Dec. 7 . . Bill Stern's, Muskegon, Mich. . . E. H. King, Hill & Griffith Co.

Western New York . . Dec. 5 . . Sheraton Hotel, Buffalo, N. Y. . . H. J. Weber, AFS, *"Legislation Affecting Foundries."*

Wisconsin . . Dec. 13 . . Schroeder Hotel, Milwaukee . . *Christmas Party.*

In keeping with trad ititon, members of the **Central New York Chapter** opened season of technical meetings Sept. 13 at Trinkaus Manor, Oriskany, N.Y., 60 miles from Syracuse, N.Y., the chapter headquarters. M. Bock II, Exomet, Inc., Conneaut, Ohio, was the guest speaker. His subject was *"Risering—Feeding Exothermic Compounds."* Mr. Bock, left, diverted from theory to practice long enough to feed hors d'oeuvres, to Chapter Chairman N. W. Meloon.

More than 250 members of the **Central Illinois Chapter** attended the annual fish fry held in September at Groveland, Ill.

Mo-Kan Chapter members were addressed on Sept. 6 by Frank Newberry, Oklahoma Steel Castings Co., Tulsa, Okla., who told how the carbon arc-compressed air pad washing has reduced grinding and cleaning costs in the finishing room of Oklahoma Steel Castings. E. C. Austin, National Aluminum & Brass Foundry, Inc., past chairman, was presented with a gift for his work on behalf of the chapter. Lloyd Canfield, membership chairman, was awarded a certificate for increasing chapter membership during the 1956-57 year.

British Columbia Chapter Holds Annual Fish Derby

British Columbia Chapter members held their annual fishing derby during August. Thirty boats were rented for the event. Seven prizes were awarded for the largest salmon. Prize-winning catches ranged from 5½ to 17½ lb. Winners were H. Littlejohns, Canadian Sumner Iron Works Ltd., Vancouver; C. Bergeron, Empire Stevedoring Ltd.; G. McBain, Industrial Engineering Ltd., Burnby; J. Tapella, Balfour Guthrie (Canada) Ltd., Vancouver; G. Culley, McLean & Powell Iron Works, Ltd., Vancouver; O. Rolls, Canada Metal Co. Ltd., Vancouver; and E. Osterblad, A-1 Steel & Iron Foundry Ltd., Vancouver.

H. J. Weber, AFS Director of Safety, Hygiene & Air Pollution, addressed the chapter on **"Legislation Affecting Foundries."** The meeting was attended by 50 chapter members and 15 guests from the Vancouver Pure Air Organization.

Approximately 400 **Philadelphia Chapter** members and guests attended the annual outing held at the Manufacturers Country Club, Oreland, Pa. Recreation included golfing, softball, and horseshoe pitching. The day was concluded with a dinner and show. Chapter Chairman H. C. Winte, presided. Co-chairmen for the entertainment committee were W. J. Gallana, E. J. Lavino & Co., and L. Dill, Geo. **F. Pettinos Co.**

Members of the **Wisconsin Chapter** executive board met in September. A. M. Slichter, AFS National Director, left, rear, also attended. Shown left to right around table are: immediate past president, G. J. Barker, Publicity Chairman E. M. Sobota, Vice-President, L. J. Woehlke, Director R. W. Heine, President N. N. Amrhein, Treasurer B. H. Booth, Secretary L. J. Andrés, Director J. A. Arter, Director R. J. Vanden Heuvel, Director Harry Arneson, and past president G. E. Tisdale.

New officers and directors of the **Pittsburgh Chapter,** sitting left to right, Secretary-Treasurer, E. P. Buchanan, Pittsburgh Coke & Chemical Co.; president, G. J. Miklos, Westinghouse Electric Corp.; Vice-President, I. W. Sharp, American Steel Foundries. Directors standing left to right, E. J. Biller, Vulcan Mold & Iron Co., W. D. Hacker, Mesta Machine Co., Stephen Davis, American Brake Shoe Co., and J. D. Wilson, Bronze Die Casting Co.

SEPTEMBER 27 & 28

ROLLA, MO.

news

MISSOURI VALLEY CONFERENCE
features Improved Techniques That Keep Castings Competitive

J. H. SCHAUM/*Editor*

Over 200 men of the castings industry were drawn to the University of Missouri School of Mines & Metallurgy to participate in a broad program aimed at keeping metal castings ahead of competitive processes and materials. In order to accommodate the 13 top-ranking technical speakers in the full day-and-a-half schedule, simultaneous sessions were held in three categories—gray iron, non-ferrous, and steel castings.

The conference was officially opened by Conference Chairman H. C. Deterding, Sonken-Galamba Corp. National AFS Director R. W. Trimble presided over the opening session at which the conferees were welcomed to Rolla by Dean C. L. Wilson, Missouri School of Mines and Metallurgy. Dean Wilson pointed out that the AFS Student Chapter at M.S.M was the largest and fastest growing one in the country. American Foundrymen's Society President H. W. Dietert addressed the foundrymen, primarily from Missouri, Kansas, and Oklahoma, about new AFS activities contributing to progress in their industry.

Time-out from technical sessions was afforded by an entertaining luncheon program. W. L. Kammerer, Midvale Mining & Mfg. Co., acted as toastmaster for the occasion. Mr. Kammerer was Chairman of the First Missouri Valley Regional Conference held in 1955. Realizing the value of an early start, it was announced that the Chairman of the 1959 Regional Conference would be D. Mitchell, Progressive Brass Mfg. Co., Tulsa, Okla.

Short comments were made after the luncheon by Wm. W. Maloney, general manager, American Foundrymen's Society; National AFS Director R. W. Trimble; Conference Chairman H. C. Deterding; E. J. Walsh, executive director, Foundry Educational Foundation; and C. V. Nass, president of F.E.F. The principal luncheon speaker was the highly entertaining A. Carl Weber, director of research engineering, Laclede Steel Co.

On the social side of the program was the outing and barbecue at Forest Springs Lodge. Appropriately nearby was the well preserved remains of the Ozark Iron Works blast furnace—built in 1873 to utilize local iron deposits. After being well fed with spareribs, chicken, ham and fish. A generous supply of door prizes were distributed by drawing lucky numbers. Every one who did not get a prize agreed that the drawing was rigged but handled with exceptional finesse by master of ceremonies J. W. Randall, Great Lakes Carbon Corp. An Ozark hillbilly jamboree provided appropriate background music for the late-late session.

Non-ferrous Highlights

The non-ferrous program was appropriately opened by H. F. Scobie, executive secretary, Non-Ferrous Founders' Society, telling *"What's New Among Non-ferrous Foundrymen?"* Among new ideas were included fireproof bottom boards, mica strainer cores, waterless molding sand, carbon sand, heat resistant wood for patterns, and die cast engine blocks.

"Production of Quality Aluminum Castings" was described by C. F. Maxwell, Aluminum Div., Howard Foundry Co. The speaker outlined the extensive controls over the multitude of foundry operations that Howard Foundry must exercise in order to produce quality castings. As a jobbing foundry they have succeeded in upgrading their men to assume the responsibilities of close control over every step so that castings meet the most rigid civilian as well as military inspection.

Converting a sand casting operation over to permanent mold casting by retraining the same employees is quite an accomplishment. C. B. Curtis, Maytag Co., told how this was done in his talk entitled *"Permanent Molding of Aluminum Castings."* The gear case and gear case cover for washing machines is being cast in an aluminum base alloy containing 4.5 per cent copper and 6 per cent silicon. Permanent mold is made of SAE-AISI H13 grade tool steel.

Metal is melted in gas-fired reverberatory barrel type furnaces and then transferred to a "two chamber", type induction holding furnace. As the result of their conversion experiences the speaker felt that many foundries should consider this way of economically producing high quality castings with a low cost tooling investment.

"Liquid Forgings" was the term coined by M. E. Nevins, Wisconsin Centrifugal Foundry, Inc., to describe centrifugal castings. Discussing the pros and cons of centrifugal casting, Mr. Nevins listed the following advantages: metal free from shrinkage and dirt, better physical properties, better surface finish, final cost of finished part frequently lower, and dies relatively inexpensive. On the negative side, some of the drawbacks are: all shapes cannot be cast, some sizes, shapes, and qualities are uneconomical, technique is more dangerous, and a machine shop is a necessity.

The speaker described a newly installed German-made gas-fired furnace for reclaiming all their non-ferrous borings. For aluminum bronze, melting loss is only 9 per cent and cost of melting runs 7 cents per pound.

Gray Iron Talks

National AFS Director C. E. Drury, Danville Plant, Central Foundry Div., GMC, described work at his plant on *"Gating to Control Pouring Rate and its Effect on Castings."* It was found that as the iron velocity in the runner decreased, slag defects in castings decreased.

Use of a skim core in the cope is most effective in reducing pouring

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Sponsored by:

University of Missouri
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St. Louis Chapter
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R. V. Wolf
School of Mines & Metallurgy

Allan G. Wehr
Student
School of Mines & Metallurgy

Missouri Valley Regional

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rate. Pouring lips on ladles were redesigned to aid pour-off men in accurately hitting the pouring sprue with stream of metal. Guide bars were also installed so that height of ladle lip above sprue was held constant throughout all pouring operations.

"Inoculation and Alloying Agents for Gray Cast Iron" was the subject of H. H. Wilder, Vanadium Corp. of America. The talk covered gray iron

Registration desk checked in over 200 for the conference.

inoculation—what it is, how to do it, effects, advantages and disadvantages.

H. H. Kessler, Sorbo-Mat Process Engineers, talked about the inter-relation between *"Melting, Molding and Men"* in modern gray iron foundry practices. Particular emphasis was placed on good housekeeping and intelligent gating and risering practices.

"Molding Sands, Molding Methods and Casting Dimensions" provided the nucleus of a talk by J. S. Schumacher, Hill & Griffith Co. According to the speaker, for accurate casting dimensions, the foundryman must have: 1) sand mold with uniform and reasonably high relative density plus high green strength and hardness, 2) a deep flask, 3) sand with optimum response to jolting and squeezing, 4) good quality patterns, and (5) sand mix with lowest moisture content practical.

W. A. Hambley, Chas. A. Krause Milling Co., gave some good advice on the subject of ***"Casting Defects."*** Rather than blaming sand or metal for scrap, the speaker pointed to inadequate supervision as the culprit. The money lost in scrap castings could more than pay for the added expense of a quality control program.

Illustrated with a number of slides

Continued on page 81

FOUNDRY FACTS NOTEBOOK

Introduction to Patternmaking

FOUNDRY FACTS NOTEBOOK *is designed to bring you practical down-to-earth information about a variety of basic foundry operations. As the name implies, this page is prepared for easy removal and insertion into a notebook for handy future reference.—Editor.*

The patternmaker constructs the patterns which are the necessary prerequisites in the making of molds for the casting of all metals. Patternmaking is most important today in the manufacture of all types of machinery for modern industry.

A patternmaker must be readily able to read a drawing, a sketch, or blueprint correctly, and then visualize the finished article. He must have a general knowledge of foundry methods and techniques in order to construct the pattern required to make the mold for casting the molten metal into the desired shapes and sizes.

He must have a comprehensive knowledge of the principles of foundry practices, molding and coremaking, estimate the shrinkage of metals, and visualize every process of manufacture from the drafting table to the finished article. He should have a knowledge of the equipment and limitations of the machine shop that will eventually machine finish the castings.

Start With Hand Tools

Since skill of hand and eye is one of the prerequisites of good craftsmanship, the student should strive to learn the proper use of hand tools early in his career. It has been aptly stated that "a machine-trained patternmaker is lost without modern equipment, but he who possesses manual skill fears no occasion." The projects in this chapter will, therefore, stress the use of hand tools and bring attention to significant techniques that, once acquired, will always endure.

Before beginning the construction of a pattern, the method of molding must be decided. Since the pattern is imbedded in a sand mold to form the impression into which molten metal is poured, provisions must be made to withdraw the pattern from the sand. The process of ramming the sand about the pattern packs the sand firmly against the pattern surfaces. To loosen the impacted pattern, the molder raps or vibrates it so that it can be withdrawn from the mold.

When the sides of the pattern are vertical to the parting surface of the mold, rapping will in some cases provide sufficient clearance; however, in most cases the patternmaker adds clearance as taper to the pattern. It is obvious that a taper or wedge shape will draw neatly from the mold without tearing or breaking the sand. In the language of the patternmaker, he "gives the pattern draft" to facilitate drawing it from the mold.

The amount of draft that is allowed varies in different jobs. Generally a taper of 1/8-in. to the foot is considered "good draft." However, more or less is allowed according to the character of the casting and the molding conditions.

To make a casting of the desired dimensions, "shrinkage" must be considered. Shrinkage is the amount the pattern is made oversize to allow for the contraction of metal as it cools and solidifies in the mold. Shrinkage varies with different metals. The customary allowance for cast iron is 1/10-in. per foot. Special shrinkage rulers are made for each common cast metal. Selecting the proper one he proceeds, using the given dimensions, without need to calculate the shrinkage for each measurement of the pattern.

Pattern Construction

The filler plate casting illustrated in Fig. 1 is an example of a pattern that can be made with little or no draft since it will have but moderate depth in the mold. Rapping of the pattern will release it from the sand. The pattern is made in the following manner:

Practical use of handtools is basic to patternmaker's trade.

Introduction to Patternmaking

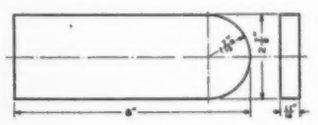

Fig. 1 . . Views of pattern.

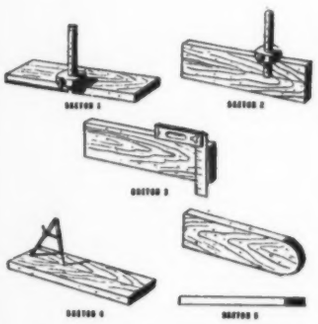

Fig. 2 . . Essential tools are simple but sufficient.

1. Obtain suitable material such as a piece of soft pine about 3/4 x 3 x 9 in.

2. Plane one surface of the material smooth and true. Plane one edge true. This edge is called the "working edge" since the essential lines are scribed from this edge.

3. Set the marking gage to thickness, 11/16-in., and scribe thick ness lines on all edges of the material (Fig. 2).

4. Set the marking gage to one half the width of the material and scribe a center line (Sketch 2).

5. Using the try square from the working edge, scribe a knife line at right angles across the material near one end. Measure 8 in. from this line and establish a knife point on the center line for the length of the pattern (Sketch 3).

6. Set the dividers at 1-7/16-in. and from the center line scribe a half circle through the knife point. With the same setting, scribe arcs on the other end for the width of the pattern. Scribe lines, parallel to the center line, tangent to the arcs and the half circle. This completes the outline of the pattern (Sketch 4).

7. Plane the material to the thickness, splitting the gaged lines. Band saw to the outlines of the pattern allowing excess material for sanding and for draft (Sketch 5).

8. Set the sanding disc table to the proper angle for draft and sand to the line.

9. Sandpaper smooth, and shellac.

Improving Technique

Emphasis should be placed upon several operations enumerated for the filler plate pattern such as items 3, 4, and 6. When any tool, namely, the marking gage or dividers, is in use it is good practice to establish as many lines or points as are convenient before laying it aside for another tool. Practice will develop this as a habit and save much time in the selection of tools for repetitive operations.

Items 4 and 5: Note that datum lines are established, such as a center line, from which all significant measurements are taken, thereby avoiding many errors. Item 5: When making lines across the grain, use a knife. This cuts the wood fibres and makes a clean line. When scribing parallel to the grain of the wood, the gage or scriber is used because the knife point would follow the grain of the wood and tend to split the wood fibers lengthwise, causing them to sliver when the pattern is finished.

This type of pattern is molded in a wood or metal frame known as a "flask." This flask is made up of two parts, the lower half being designated as the "drag" and the upper half, the "cope." The drag and cope are accurately located together by means of the "flask pins," which allow the cope and drag to be separated to draw the pattern from the mold, after which the two halves are replaced in the same position.

Molding Procedure

To mold the filler plate (Sketch 1 in Fig. 3) the pattern is laid flat on the mold board; the flask is then placed over the pattern, with the parted face down, and sand is rammed over the pattern to fill the drag flask (Sketch 2). It is then rolled over on the mold board so the parting face is up. The cope flask is guided by the flask pins and placed in position (Sketch 3). Sand is rammed to fill the flask. The cope is lifted and the pattern is drawn, after which the cope is replaced (Sketch 4).

The impression of the pattern is now incorporated in the body of the mold. The gate or sprue through which the molten metal enters the mold cavity is shown in the completed mold.

■ This information was abstracted from PATTERNMAKER'S MANUAL, published by the American Foundrymen's Society.

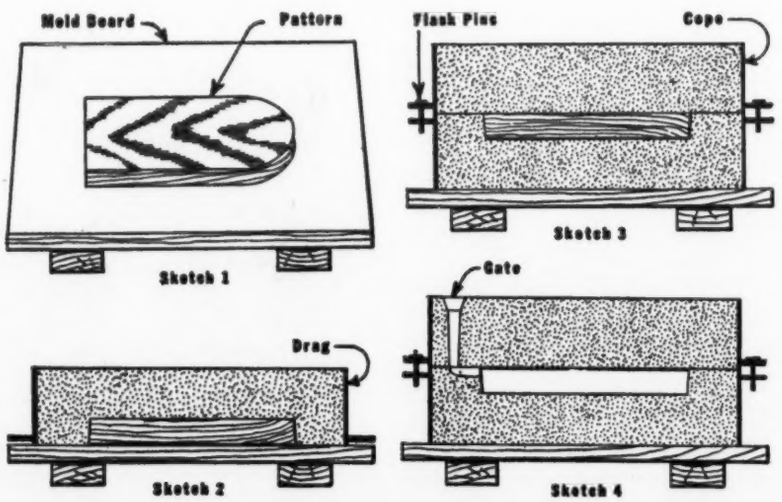

Fig. 3 . . Pattern is used to form cavity in mold for molten metal.

AFS — news —

Missouri Valley Regional

Continued from page 78

and an excellent high-speed color motion picture, A. S. Grot, Edward Valves, Inc., explained how to "*Design Valves for Sound Castings.*" One secret of success in producing shrinkage free valve body castings is to select areas to serve as end effects and other sections for attaching risers.

Steel Casting Program

"*Manual Magnetic-Flux Gas-Shielded Arc Welding of Mild Steel*" was a new development of particular importance to the castings industry described by H. T. Smith, Linde Co., Div. Union Carbide Corp. In this technique bare welding wire is automatically fed into the torch along with flux carried in a CO_2 stream. Welding current in wire establishes a magnetic field that attracts the magnetizable flux to the wire so it is "flux covered."

C. E. Drury, one of 13 top technical speakers at Rolla.

M. D. Stepath, Arc-Aire Co., acquainted foundrymen with "*The Arc-Aire Process*". The process combines a DC welding machine, a carbon-graphite electrode, and a jet of compressed air. The result is a versatile torch for washing off riser pads and removing surface defects.

"CO_2-Set Cores for Steel Castings" was a talk by J. M. Venetucci, Liquid Carbonic Corp. The process was evaluated by detailing the effects of various sand additives on the physical properties of sand cores. Mulling time has an important influence on the final properties attained. Properly evaluated and applied, CO_2 cores are another valuable tool for the steel foundrymen.

Circle No. 193, Page 7-8

Aluminum in Ferro-Silicon Has Mixed Effect on Irons

■ British investigation discloses that there is an increased tendency for ferro-silicon to cause pinholding in nodular cast iron as the aluminum content of the ferro-silicon increases. The research was conducted by J. V. Dawson, British Cast Iron Research Association. His investigation deal with aluminum's effect on the incoulating power of ferro-silicon.

Other conclusions were:

1. In relatively light section nodular iron castings poor inoculation is obtained when the aluminum content of the ferro-silicon is low. This difference is not so obvious in heavier sections.

2. The inoculating effect of ferro-silicon in ordinary gray iron is greatly increased by the presence of aluminum in the inoculant. This effect can also be obtained by suitable additions of aluminum either before or in conjunction with the ferro-silicon addition. It does not however occur when the aluminum is added after the ferro-silicon has dissolved.

3. The increased inoculation due to aluminum gives a significant improvement in irons used.

dietrich's corner

by h. f. dietrich

Dear Doc: When I wrote the article which appeared in the April issue of MODERN CASTINGS, I didn't intend to set a fire under the medical world. However, I have received comments from medical men from coast to coast. I must have heard from everyone except Doc. Jebwaberiberitobisi, M.M. (Medicine Man) of the Interior Haiti Voodoo Clinic.

The furor caused by my article reminded me of the time I went to the flask yard for a 30 in. square flask and found, on my way back to the foundry, that I had inadvertently taken the breezeway to a yellow jacket's nest. In either case, the reaction was sudden and to the point.

I wish to thank those doctors who read into my article no more than I wrote, and who were amused by it. Every profession is made up of human beings. As long as we can smile at their antics, we are still on the right track.

Doctor McCord, of the University of Michigan, objected to the remote period from which I drew my material. He also suggested that I read the article, "Is there a Doctor in the Plant?" which appeared in the March 30, issue of the *Journal* of the American Medical Association, and contained his comments. I secured a reprint of this article and read it diligently. For those of you who do not subscribe to the *Journal*, I would like to quote a few excerpts.

"Some symptoms of lead poisoning among printers ('dry bellyache with loss of the use of their limbs') were chronicled over 200 years ago by a highly perceptive American named Benjamin Franklin."

This goes back in time even further than I did. Anything we write must necessarily be past history, even if it happened yesterday. The author of, "Is there a Doctor in the Plant?" was not of the laity, therefore, there should be no objection to my using his example of mistaken diagnosis as given in this quotation.

"In Detroit several years ago, for example, a doctor examined his thin, ashen-faced patient — a factory spray painter — and gave a diagnosis of lead intoxication. It turned out there was no lead in the factory paint; the patient actually was suffering from a nonoccupational primary anemia."

The most effective scales we can have on our eyes are those provided by nature. Just closing our eyes does not cause a condition to cease to exist. You can see in the next quotation that a study must have been made to form a set of ethical rules for the success of a physician in occupational medicine. This study must have turned up *some* mercenary physicians, otherwise, there would have been no basis for rule two.

"Physicians who take on (sic) active part in occupational medicine are engaged essentially in health protection and promotion. Experience has shown that their success is best assured when, in performing their industrial health service, they observe the basic principle of service to the individual; do not use their occupational health affiliation to gain private practice among employees; etc."

To do occupational medicine justice, let's read another excerpt from the *Journal*.

"Twenty-five years ago only a few hundred physicians were doing occupational medical work. Today there (are) 25,000 — including 5000 full time and the rest part time or on call." And I can safely add that they know more about it too. It is true that we have made progress in industrial health and safety. But we still have a long road ahead. We need the answer to the common cold — still the cause of most lost time illness.

We need a fast method of determining who will react unfavorably to penicillin and other anti-bacterial wonder drugs so that these can be used to their full therapeutic potential. We need to find the 10% accident prone early in life to train them for nonhazardous occupations, or better still, find the cause of accident proneness. We must find the answer to hypertension brought on by frustrating high production methods.

Education of employees has given us the progress made toward plant safety. Education is not a one shot therapy; it must be continuing. The occupational physician alone can't get the job done. *Occupational health and safety are everybody's business.*

Permanent Molding Aids Mechanization Program

by C. B. Curtis /
Chief Plant Process Engineer
Maytag Co.,
Newton, Iowa

Adoption of the permanent molding process by the Maytag Co., Newton, Iowa, has yielded high quality castings with a minimum of finishing operations. The process may be fitted into a mechanization program with reasonable expenditures for tooling and replenishment costs by many foundries.

Currently Maytag is producing two castings by permanent molding. These are the washing machine gear case and gear case cover, considered from a structural basis the two most important parts.

Maytag places the casting cavity horizontally with hub sections in the bottom half of the cavity. The pouring

Gear house cover, before and after removing gates, risers.

sprue, the gating, and the risers are placed on the periphery of the outside rim. There are four main segments consisting of the bottom or base; two side segments which form the gating, the riser, and the pouring sprue cavities; and the fourth or top core segment which forms the inside or top side of the gear case.

The casting for the gear case cover is made in the same mold design arrangement placing the hub downward and using the top segment for coring out the inside of the casting cavity.

Mold Design

Mold design for the gear housing allows the pouring sprue and risers located on top of the casting flanges to be removed during the initial machining operation by a milling cutter-type machine. In the gear housing cover, the pouring sprue, gates and risers, located around the edge of the

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Help Wanted

FOUNDRY ENGINEER
FOR
BRASS FOUNDRY

National mfg. concern with plant in Greater Boston area has vacancy for man with broad training in non-ferrous met. and with 5 years' exp. in non-ferrous operations. Must be capable of handling all tech. operations in connection with foundry. This is a challenging opportunity with respect to shell molding and other modern foundry processes. Write fully giving details of education, experience, salary requirements to:
Box D-87, MODERN CASTINGS

METALLURGICAL ENGINEER

Nationally known Central Illinois Malleable Iron Foundry; 650-750 employees, has an immediate opening for a young graduate Metallurgical Engineer.

Applicants should state age, education, and experience, if any, in first letter.

Box No. D-84, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.

FOR SALES DEPARTMENT—A large Middle West foundry, manufacturer of malleable and steel castings, requires the services of a man for its sales department. Applicant must have technical knowledge of foundry casting problems and actual experience selling ferrous castings in the Middle West. All replies will be kept confidential. Please send a complete resume including salary desired. Our sales organization is aware of this ad. **Box No. D-86, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

FOUNDRY SUPERVISOR — experienced — to direct high production mechanized iron molding operations in St. Louis. Excellent future. **Box No. D-81, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

Wanted to Buy

TRANSACTIONS AFS back volumes and sets—wanted to buy for cash, also other scientific and technical Journals. **A.S.F. ASHLEY, 27 E. 21st Street, New York 10, N.Y.**

WANTED: Field Service and Sales Representative, with technical sand control or metallurgical experience.

A well-established manufacturing and supply company has an opening for an aggressive man who likes sales work, and who can adjust to being away from home an average of ten nights per month.

Southern territory, salary, car and expenses, plus profit-sharing, bonus and retirement plan. Basic salary open, in keeping with experience and ability. Our own men know of this offer.

Write Box No. D-82 giving details of education, foundry experience and personal data. % **MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

For Sale

4 x 6 ALLIS CHALMERS Vibrating Shake-Out, New 1948, very good condition, complete, immediate availability.

Box D-83,
MODERN CASTINGS,
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Molding Machine: Herman 6000# capacity, jolt-roll-draw in operating condition. Asking $2,900.00 FOB **Pottstown Machine Co., Pottstown, Pa. (Phone 37, H. H. Houston).**

FURNACES FOR SALE

10 used Heat-Treating Furnaces, and two 7-ton gantry cranes, good condition, priced to sell.

BAER STEEL PRODUCTS. INC.
Box 1428
Boise, Idaho

For Sale-Lease or Joint venture. Going nonferrous specialty foundry and polishing Shop. Two oil furnaces, established eighteen years. Good brick building. **HODGE & SHERMAN AGENCY, 304 First National Bank Bldg., Elkhart, Indiana.**

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SUPERINTENDENT or General Foreman in all foundry departments—brass, bronze and aluminum; in all die casting and finishing departments. 24 years experience. Age 45. **Box D-85, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

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Successfully managing internationally known captive gray iron Foundry of 250 Ton capacity. Graduate Metallurgical Engineer, age 48, 22 years experience at operating and management levels. For personal reasons would consider responsible position requiring thorough practical background all phases Foundry operations. **Box No. D-80, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

Casting Salesman selling casting buyers in New Jersey and New York desires extensive line. Technical background. **Box D-77, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

Engineering Service

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Exclusively serving the foundry industry since 1930
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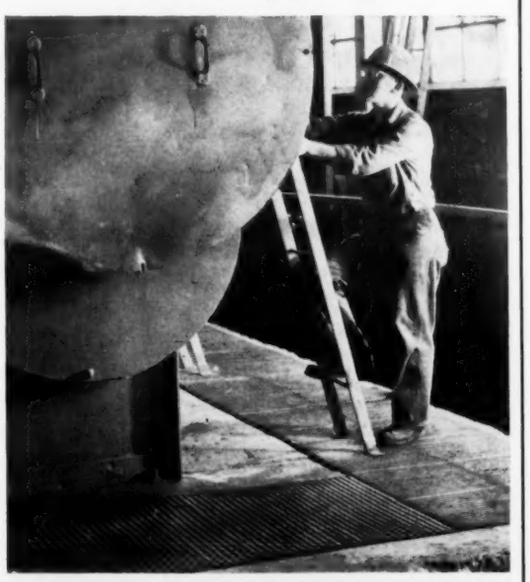
Grates Prevent Slipping

Now There's An Idea

In an effort to cut slipping accidents, Albion Malleable Iron Co., Albion, Mich. installed floor grates around its shot blast unit. Now the spilled shot drops out of the way and is collected below.



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flange are easily broken off while the casting is warm.

Maytag finds that air cooling is generally sufficient to provide progressive solidification of the metal. Water-cooled plugs, coatings within the cavity, and chills may also be used to solve the problem. Air is preferred to the use of water-cooled plugs since it reduces the thermal shock to the mold body and eliminates the expense of maintaining the plug.

Application of the mold coatings is essential to efficient operations. At Maytag the die setter is responsible for mold cleaning and re-coating. Coatings are sprayed or painted on the molds after preheating to 350 F by gas burners. Three coatings are used. On the general casting cavity a medium weight coating is employed; a light weight coating is used on core pins and areas where little draft or taper is possible. On the riser, pouring sprue and gating runner areas a heavy insulating coating is recommended.

Melting

Melting is done in a reverberatory barrel-type furnace fired by natural gas. After melting, the metal is fluxed, skimmed, and again brought to control temperature at which time it is transferred to the holding furnace by a 500-lb capacity cast iron ladle mounted on a motorized fork truck.

The holding furnaces are the two-chamber electric induction type. One chamber receives the molten metal charge, the other serves as a ladle reservoir. The units are automatically controlled by a thermocouple holding within 5 F.

Quality Control

Close control of the metal is achieved through the use of specimens cast under vacuum. Macroscopic study reveals gas inclusion porosity of the specimen. These tests fix the origin of deviation from normal practice.

Other quality control steps include the frequent analysis of the metal and spectrographic and chemical anlysis of incoming metals. In order to quickly isolate contaminated metal, a performance chart is maintained. It shows the results of leakers plotted against the metal source. When contamination is discovered, all of the metal is withdrawn and used in other operations.

Little or no snag grinding is needed in the finishing operations. The castings are visually inspected and also subjected to a 100 per cent air-pressure test. Often the castings are inspected within two hours after leaving the pouring line.

advertisers and their agencies

This index is published as a convenience to the readers. While every care is taken to make it accurate MODERN CASTINGS assumes no responsibility for errors or omissions.

Elevated Temperature Test Procedures are Released

■ *"Standard Elevated Temperature Testing Procedures for Metallic Materials,"* the second in a series of standardized material testing procedures for the aircraft industry, has been released by the Aircraft Industries Association.

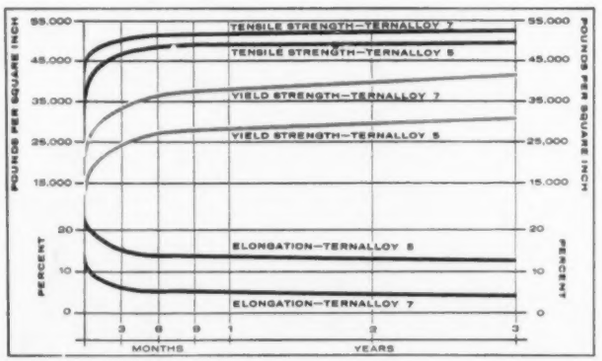
This 10-p bulletin contains sections on elevated temperature tensile testing, short-time tensile creep and rupture testing.

Each standard contains sections dealing with the test specimens, test apparatus, heating methods, and measurement.

TOUGHER ... and without heat treatment!

APEX

High YIELD strength TERNALLOY Aluminum Alloys



Chillcast Ternalloys 5 and 7
Room Temperature Aging

These curves are typical for all of the Ternalloys. Specific values for sand casting and Ternalloys 6 and 8 will vary slightly.

More Opportunities for Foundrymen and Engineers

- Ternalloy combines high tensile and yield strengths with extraordinary high elongations—qualities not found in other aluminum alloys.
- Affords greater accuracy of dimension, extra economy through elimination of heat treating. The metal flows smoothly.
- Adapted to the sand, plaster and permanent mold processes. May be cast in complicated shapes, its fine grain produces pressure tight castings.
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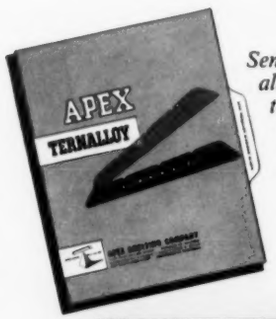
- Available in four choices, each tailored to your specific requirements.



Send without obligation for Apex Ternalloys booklet showing as-cast properties, compositions, effect of room temperature aging, other features. Address Apex Smelting Company, 2537 W. Taylor St., Chicago 12, Ill.

APEX SMELTING COMPANY

CHICAGO • CLEVELAND • LOS ANGELES

Research leadership back of every ingot

modern castings

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